

8/B

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<110> Sherman, D.H.  
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Zhao, L.

<120> DNA encoding methymycin and pikromycin

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<140> US 09/988,384

<141> 2001-11-19

<150> PCT/US99/14398

<151> 1999-06-25

<150> US 09/105,537

<151> 1998-06-26

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 Leu Asp Ser Leu Asp Leu Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro  
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Thr	Ala	Phe	Asp	Ala	Val	Ala	Ala	Glu	Leu	Asp	Pro	Leu	Leu	Asp	Arg	
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Glu	Glu	Ala	Leu	Ala	Pro	Gly	Thr	Asp	Ala	Pro	Asp	Ala	Arg	Asp	Val	1860	1865	1870
Thr	Val	Val	Pro	Leu	Leu	Arg	Ala	Gly	Arg	Pro	Glu	Pro	Glu	Thr	Leu	1875	1880	1885
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Phe	Arg	Arg	Glu	His	Tyr	Trp	Leu	Thr	Pro	Glu	Ala	Arg	Thr	Asp	Ala	1925	1930	1935
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His	Val	Gly	Ala	Val	Arg	Val	Glu	Glu	Leu	Thr	Leu	Glu	Ala	Pro	Leu	2005	2010	2015
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Asp	Gly	Glu	Ser	Pro	Ala	Gly	Arg	Thr	Phe	Gly	Val	Tyr	Ser	Thr	Pro	2035	2040	2045
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Gly Ala Asp Thr Leu Ala Glu Ile Arg Leu Pro Ala Ala Gln His Glu	2130	2135	2140	
Ser Ala Gly Leu Phe Gly Val His Pro Ala Leu Leu Asp Ala Ala Leu	2145	2150	2155	2160
His Pro Ile Val Leu Glu Gly Asn Ser Ala Ala Gly Ala Cys Asp Ala	2165	2170	2175	
Asp Thr Asp Ala Thr Asp Arg Ile Arg Leu Pro Phe Ala Trp Ala Gly	2180	2185	2190	
Val Thr Leu His Ala Glu Gly Ala Thr Ala Leu Arg Val Arg Ile Thr	2195	2200	2205	
Pro Thr Gly Pro Asp Thr Val Thr Leu Arg Leu Thr Asp Thr Thr Gly	2210	2215	2220	
Ala Pro Val Ala Thr Val Glu Ser Leu Thr Leu Arg Ala Val Ala Lys	2225	2230	2235	2240
Asp Arg Leu Gly Thr Thr Ala Gly Arg Val Asp Asp Ala Leu Phe Thr	2245	2250	2255	
Val Val Trp Thr Glu Thr Gly Thr Pro Glu Pro Ala Gly Arg Gly Ala	2260	2265	2270	
Val Glu Val Glu Glu Leu Val Asp Leu Ala Gly Leu Gly Asp Leu Val	2275	2280	2285	
Glu Leu Gly Ala Ala Asp Val Val Leu Arg Ala Asp Arg Trp Thr Leu	2290	2295	2300	
Asp Gly Asp Pro Ser Ala Ala Ala Arg Thr Ala Val Arg Arg Thr Leu	2305	2310	2315	2320
Ala Ile Val Gln Glu Phe Leu Ser Glu Pro Arg Phe Asp Gly Ser Arg	2325	2330	2335	
Leu Val Cys Val Thr Arg Gly Ala Val Ala Ala Leu Pro Gly Glu Asp	2340	2345	2350	
Val Thr Ser Leu Ala Thr Gly Pro Leu Trp Gly Leu Val Arg Ser Ala	2355	2360	2365	
Gln Ser Glu Asn Pro Gly Arg Leu Phe Leu Leu Asp Leu Gly Glu Gly	2370	2375	2380	
Glu Gly Glu Arg Asp Gly Ala Glu Glu Leu Ile Arg Ala Ala Thr Ala	2385	2390	2395	2400
Gly Asp Glu Pro Gln Leu Ala Ala Arg Asp Gly Arg Leu Leu Ala Pro	2405	2410	2415	
Arg Leu Ala Arg Thr Ala Ala Leu Ser Ser Glu Asp Thr Ala Gly Gly	2420	2425	2430	
Ala Asp Arg Phe Gly Pro Asp Gly Thr Val Leu Val Thr Gly Gly Thr	2435	2440	2445	
Gly Gly Leu Gly Ala Leu Leu Ala Arg His Leu Val Glu Arg His Gly	2450	2455	2460	
Val Arg Arg Leu Leu Leu Val Ser Arg Arg Gly Ala Asp Ala Pro Gly	2465	2470	2475	2480
Ala Ala Asp Leu Gly Glu Asp Leu Ala Gly Leu Gly Ala Glu Val Ala	2485	2490	2495	
Phe Ala Ala Ala Asp Ala Ala Asp Arg Glu Ser Leu Ala Arg Ala Ile	2500	2505	2510	
Ala Thr Val Pro Ala Glu His Pro Leu Thr Ala Val Val His Thr Ala	2515	2520	2525	
Gly Val Val Asp Asp Ala Thr Val Glu Ala Leu Thr Pro Glu Arg Leu	2530	2535	2540	
Asp Ala Val Leu Arg Pro Lys Val Asp Ala Ala Trp Asn Leu His Glu	2545	2550	2555	2560

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<212> PRT

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Gly	Val	Val	Val	Val	Glu	Pro	Trp	Trp	Phe	Pro	Glu	Thr	Phe	Ala	Asp	
				965					970					975		
Gly	Trp	Val	Ser	Ala	Asp	Val	Val	Arg	Arg	Asp	Gly	Arg	Thr	Val	Ala	
			980					985					990			
Arg	Val	Ser	His	Ser	Val	Arg	Glu	Gly	Asn	Ala	Thr	Arg	Met	Glu	Val	
		995					1000						1005			

His Phe Thr Val Ala Asp Pro Gly Lys Gly Val Arg His Phe Ser Asp  
 1010 1015 1020  
 Val His Leu Ile Thr Leu Phe His Gln Ala Glu Tyr Glu Ala Ala Phe  
 1025 1030 1035 1040  
 Thr Ala Ala Gly Leu Arg Val Glu Tyr Leu Glu Gly Gly Pro Ser Gly  
 1045 1050 1055  
 Arg Gly Leu Phe Val Gly Val Pro Ala Met Thr Gly Lys Thr Arg Ile  
 1060 1065 1070  
 Pro Arg Val Arg Arg Gly Arg Thr Pro Arg Ala Phe Thr Leu Ala  
 1075 1080 1085  
 Val Val Gly Thr Leu Leu Ala Gly Thr Thr Val Ala Ala Ala Pro  
 1090 1095 1100  
 Gly Ala Ala Asp Thr Ala Asn Val Gln Tyr Thr Ser Arg Ala Ala Glu  
 1105 1110 1115 1120  
 Leu Val Ala Gln Met Thr Leu Asp Glu Lys Ile Ser Phe Val His Trp  
 1125 1130 1135  
 Ala Leu Asp Pro Asp Arg Gln Asn Val Gly Tyr Leu Pro Gly Val Pro  
 1140 1145 1150  
 Arg Leu Gly Ile Pro Glu Leu Arg Ala Ala Asp Gly Pro Asn Gly Ile  
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 Arg Leu Val Gly Gln Thr Ala Thr Ala Leu Pro Ala Pro Val Ala Leu  
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 Ala Ser Thr Phe Asp Asp Thr Met Ala Asp Ser Tyr Gly Lys Val Met  
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 Gly Arg Asp Gly Arg Ala Leu Asn Gln Asp Met Val Leu Gly Pro Met  
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 Met Asn Asn Ile Arg Val Pro His Gly Gly Arg Asn Tyr Glu Thr Phe  
 1220 1225 1230  
 Ser Glu Asp Pro Leu Val Ser Ser Arg Thr Ala Val Ala Gln Ile Lys  
 1235 1240 1245  
 Gly Ile Gln Gly Ala Gly Leu Met Thr Thr Ala Lys His Phe Ala Ala  
 1250 1255 1260  
 Asn Asn Gln Glu Asn Asn Arg Phe Ser Val Asn Ala Asn Val Asp Glu  
 1265 1270 1275 1280  
 Gln Thr Leu Arg Glu Ile Glu Phe Pro Ala Phe Glu Ala Ser Ser Lys  
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 Ala Gly Ala Ala Ser Phe Met Cys Ala Tyr Asn Gly Leu Asn Gly Lys  
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 Pro Ser Cys Gly Asn Asp Glu Leu Leu Asn Asn Val Leu Arg Thr Gln  
 1315 1320 1325  
 Trp Gly Phe Gln Gly Trp Val Met Ser Asp Trp Leu Ala Thr Pro Gly  
 1330 1335 1340  
 Thr Asp Ala Ile Thr Lys Gly Leu Asp Gln Glu Met Gly Val Glu Leu  
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 Pro Gly Asp Val Pro Lys Gly Glu Pro Ser Pro Pro Ala Lys Phe Phe  
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 Gly Glu Ala Leu Lys Thr Ala Val Leu Asn Gly Thr Val Pro Glu Ala  
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 Ala Val Thr Arg Ser Ala Glu Arg Ile Val Gly Gln Met Glu Lys Phe  
 1395 1400 1405  
 Gly Leu Leu Leu Ala Thr Pro Ala Pro Arg Pro Glu Arg Asp Lys Ala  
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 Gly Ala Gln Ala Val Ser Arg Lys Val Ala Glu Asn Gly Ala Val Leu  
 1425 1430 1435 1440  
 Leu Arg Asn Glu Gly Gln Ala Leu Pro Leu Ala Gly Asp Ala Gly Lys  
 1445 1450 1455  
 Ser Ile Ala Val Ile Gly Pro Thr Ala Val Asp Pro Lys Val Thr Gly  
 1460 1465 1470  
 Leu Gly Ser Ala His Val Val Pro Asp Ser Ala Ala Pro Leu Asp  
 1475 1480 1485  
 Thr Ile Lys Ala Arg Ala Gly Ala Gly Ala Thr Val Thr Tyr Glu Thr  
 1490 1495 1500

Gly	Glu	Glu	Thr	Phe	Gly	Thr	Gln	Ile	Pro	Ala	Gly	Asn	Leu	Ser	Pro	1505	1510	1515	1520
Ala	Phe	Asn	Gln	Gly	His	Gln	Leu	Glu	Pro	Gly	Lys	Ala	Gly	Ala	Leu	1525	1530	1535	
Tyr	Asp	Gly	Thr	Leu	Thr	Val	Pro	Ala	Asp	Gly	Glu	Tyr	Arg	Ile	Ala	1540	1545	1550	
Val	Arg	Ala	Thr	Gly	Gly	Tyr	Ala	Thr	Val	Gln	Leu	Gly	Ser	His	Thr	1555	1560	1565	
Ile	Glu	Ala	Gly	Gln	Val	Tyr	Gly	Lys	Val	Ser	Ser	Pro	Leu	Leu	Lys	1570	1575	1580	
Leu	Thr	Lys	Gly	Thr	His	Lys	Leu	Thr	Ile	Ser	Gly	Phe	Ala	Met	Ser	1585	1590	1595	1600
Ala	Thr	Pro	Leu	Ser	Leu	Glu	Leu	Gly	Trp	Val	Thr	Pro	Ala	Ala	Ala	1605	1610	1615	
Asp	Ala	Thr	Ile	Ala	Lys	Ala	Val	Glu	Ser	Ala	Arg	Lys	Ala	Arg	Thr	1620	1625	1630	
Ala	Val	Val	Phe	Ala	Tyr	Asp	Asp	Gly	Thr	Glu	Gly	Val	Asp	Arg	Pro	1635	1640	1645	
Asn	Leu	Ser	Leu	Pro	Gly	Thr	Gln	Asp	Lys	Leu	Ile	Ser	Ala	Val	Ala	1650	1655	1660	
Asp	Ala	Asn	Pro	Asn	Thr	Ile	Val	Val	Leu	Asn	Thr	Gly	Ser	Ser	Val	1665	1670	1675	1680
Leu	Met	Pro	Trp	Leu	Ser	Lys	Thr	Arg	Ala	Val	Leu	Asp	Met	Trp	Tyr	1685	1690	1695	
Pro	Gly	Gln	Ala	Gly	Ala	Glu	Ala	Thr	Ala	Ala	Leu	Leu	Tyr	Gly	Asp	1700	1705	1710	
Val	Asn	Pro	Ser	Gly	Lys	Leu	Thr	Gln	Ser	Phe	Pro	Ala	Ala	Glu	Asn	1715	1720	1725	
Gln	His	Ala	Val	Ala	Gly	Asp	Pro	Thr	Ser	Tyr	Pro	Gly	Val	Asp	Asn	1730	1735	1740	
Gln	Gln	Thr	Tyr	Arg	Glu	Gly	Ile	His	Val	Gly	Tyr	Arg	Trp	Phe	Asp	1745	1750	1755	1760
Lys	Glu	Asn	Val	Lys	Pro	Leu	Phe	Pro	Phe	Gly	His	Gly	Leu	Ser	Tyr	1765	1770	1775	
Thr	Ser	Phe	Thr	Gln	Ser	Ala	Pro	Thr	Val	Val	Arg	Thr	Ser	Thr	Gly	1780	1785	1790	
Gly	Leu	Lys	Val	Thr	Val	Thr	Val	Arg	Asn	Ser	Gly	Lys	Arg	Ala	Gly	1795	1800	1805	
Gln	Glu	Val	Val	Gln	Ala	Tyr	Leu	Gly	Ala	Ser	Pro	Asn	Val	Thr	Ala	1810	1815	1820	
Pro	Gln	Ala	Lys	Lys	Lys	Leu	Val	Gly	Tyr	Thr	Lys	Val	Ser	Leu	Ala	1825	1830	1835	1840
Ala	Gly	Glu	Ala	Lys	Thr	Val	Thr	Val	Asn	Val	Asp	Arg	Arg	Gln	Leu	1845	1850	1855	
Gln	Thr	Gly	Ser	Ser	Ser	Ala	Asp	Leu	Arg	Gly	Ser	Ala	Thr	Val	Asn	1860	1865	1870	
Val	Trp	Met	Ser	Ser	Arg	Ala	Glu	Thr	Pro	Arg	Val	Pro	Phe	Leu	Asp	1875	1880	1885	
Leu	Lys	Ala	Ala	Tyr	Glu	Glu	Leu	Arg	Ala	Glu	Thr	Asp	Ala	Ala	Ile	1890	1895	1900	
Ala	Arg	Val	Leu	Asp	Ser	Gly	Arg	Tyr	Leu	Leu	Gly	Pro	Glu	Leu	Glu	1905	1910	1915	1920
Gly	Phe	Glu	Ala	Glu	Phe	Ala	Ala	Tyr	Cys	Glu	Thr	Asp	His	Ala	Val	1925	1930	1935	
Gly	Val	Asn	Ser	Gly	Met	Asp	Ala	Leu	Gln	Leu	Ala	Leu	Arg	Gly	Leu	1940	1945	1950	
Gly	Ile	Gly	Pro	Gly	Asp	Glu	Val	Ile	Val	Pro	Ser	His	Thr	Tyr	Ile	1955	1960	1965	
Ala	Ser	Trp	Leu	Ala	Val	Ser	Ala	Thr	Gly	Ala	Thr	Pro	Val	Pro	Val	1970	1975	1980	
Glu	Pro	His	Glu	Asp	His	Pro	Thr	Leu	Asp	Pro	Leu	Leu	Val	Glu	Lys	1985	1990	1995	2000

Ala	Ile	Thr	Pro	Arg	Thr	Arg	Ala	Leu	Leu	Pro	Val	His	Leu	Tyr	Gly	
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His	Pro	Ala	Asp	Met	Asp	Ala	Leu	Arg	Glu	Leu	Ala	Asp	Arg	His	Gly	
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Leu	His	Ile	Val	Glu	Asp	Ala	Ala	Gln	Ala	His	Gly	Ala	Arg	Tyr	Arg	
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Gly	Arg	Arg	Ile	Gly	Ala	Gly	Ser	Ser	Val	Ala	Ala	Phe	Ser	Phe	Tyr	
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Pro	Gly	Lys	Asn	Leu	Gly	Cys	Phe	Gly	Asp	Gly	Gly	Ala	Val	Val	Thr	
2065				2070					2075						2080	
Gly	Asp	Pro	Glu	Leu	Ala	Glu	Arg	Leu	Arg	Met	Leu	Arg	Asn	Tyr	Gly	
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Ser	Arg	Gln	Lys	Tyr	Ser	His	Glu	Thr	Lys	Gly	Thr	Asn	Ser	Arg	Leu	
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Asp	Glu	Met	Gln	Ala	Ala	Val	Leu	Arg	Ile	Arg	Leu	Ala	His	Leu	Asp	
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Asp	Pro	Val	Trp	His	Leu	Phe	Thr	Val	Arg	Thr	Glu	Arg	Arg	Asp	Glu	
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Pro	Val	Pro	Val	His	Leu	Ser	Pro	Ala	Tyr	Ala	Gly	Glu	Ala	Pro	Pro	
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Glu	Gly	Ser	Leu	Pro	Arg	Ala	Glu	Ser	Phe	Ala	Arg	Gln	Val	Leu	Ser	
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Asp	Ala	Val	Arg	Glu	Trp	Ala	Glu	Arg	Val	Asp	Gln	Ala	Met	Arg	Leu	
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Ala	Ala	Glu	Ser	His	Val	Asp	Arg	Ser	Ile	Ala	Gly	Ala	Ser	Val	Phe	
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Asn	Ser	Pro	Tyr	Ala	Ala	Ser	Lys	Ala	Gly	Ser	Asp	Leu	Val	Ala	Arg	
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Ala	Tyr	His	Arg	Thr	Tyr	Gly	Leu	Asp	Val	Arg	Ile	Thr	Arg	Cys	Cys	
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Asn	Asn	Tyr	Gly	Pro	Tyr	Gln	His	Pro	Glu	Lys	Leu	Ile	Pro	Leu	Phe	
	2435					2440						2445				
Val	Thr	Asn	Leu	Leu	Asp	Gly	Gly	Thr	Leu	Pro	Leu	Tyr	Gly	Asp	Gly	
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Ala	Asn	Val	Arg	Glu	Trp	Val	His	Thr	Asp	Asp	His	Cys	Arg	Gly	Ile	
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Ala	Leu	Val	Leu	Ala	Gly	Gly	Arg	Ala	Gly	Glu	Ile	Tyr	His	Ile	Gly	
			2485				2490							2495		



Gly	Gly	Leu	Glu	Leu	Thr	Asn	Arg	Glu	Leu	Thr	Gly	Ile	Leu	Leu	Asp	2500	2505	2510
Ser	Leu	Gly	Ala	Asp	Trp	Ser	Ser	Val	Arg	Lys	Val	Ala	Asp	Arg	Lys	2515	2520	2525
Gly	His	Asp	Leu	Arg	Tyr	Ser	Leu	Asp	Gly	Gly	Glu	Ile	Glu	Arg	Glu	2530	2535	2540
Leu	Gly	Tyr	Arg	Pro	Gln	Val	Ser	Phe	Ala	Asp	Gly	Leu	Ala	Arg	Thr	2545	2550	2555
Val	Arg	Trp	Tyr	Arg	Glu	Asn	Arg	Gly	Trp	Trp	Glu	Pro	Leu	Lys	Ala	2565	2570	2575
Thr	Ala	Pro	Gln	Leu	Pro	Ala	Thr	Ala	Val	Glu	Val	Ser	Ala	Met	Lys	2580	2585	2590
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Ser	Val	Ile	Ser	Lys	Gln	Ile	Leu	Pro	Val	Tyr	Asn	Lys	Pro	Met	Ile	2610	2615	2620
Tyr	Tyr	Pro	Leu	Ser	Val	Leu	Met	Leu	Gly	Gly	Ile	Arg	Glu	Ile	Gln	2625	2630	2635
Ile	Ile	Ser	Thr	Pro	Gln	His	Ile	Glu	Leu	Phe	Gln	Ser	Leu	Leu	Gly	2645	2650	2655
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Pro	Ala	Gly	Ile	Ala	Asp	Ala	Leu	Leu	Val	Gly	Ala	Glu	His	Ile	Gly	2675	2680	2685
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Val	Leu	Phe	Gly	Tyr	Pro	Val	Lys	Asp	Pro	Glu	Arg	Tyr	Gly	Val	Ala	2725	2730	2735
Glu	Val	Asp	Ala	Thr	Gly	Arg	Leu	Thr	Asp	Leu	Val	Glu	Lys	Pro	Val	2740	2745	2750
Lys	Pro	Arg	Ser	Asn	Leu	Ala	Val	Thr	Gly	Leu	Tyr	Leu	Tyr	Asp	Asn	2755	2760	2765
Asp	Val	Val	Asp	Ile	Ala	Lys	Asn	Ile	Arg	Pro	Ser	Pro	Arg	Gly	Glu	2770	2775	2780
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Glu	Leu	Val	Asn	Leu	Gly	Arg	Gly	Phe	Ala	Trp	Leu	Asp	Thr	Gly	Thr	2805	2810	2815
His	Asp	Ser	Leu	Leu	Arg	Ala	Ala	Gln	Tyr	Val	Gln	Val	Leu	Glu	Glu	2820	2825	2830
Arg	Gln	Gly	Val	Trp	Ile	Ala	Gly	Leu	Glu	Glu	Ile	Ala	Phe	Arg	Met	2835	2840	2845
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Cys	Ala	His	Pro	Gly	Ala	Asp	Leu	Gly	Ala	Ala	Val	His	Ala	Val	Gly	2900	2905	2910
Gln	Thr	Leu	Ala	Ala	Gly	Gly	Leu	Val	Pro	Pro	Asp	Glu	Ala	Gly	Thr	2915	2920	2925
Thr	Ala	Arg	His	Leu	Val	Arg	Leu	Ala	Val	Arg	Tyr	Gly	Asn	Ser	Pro	2930	2935	2940
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Ala	Phe	Arg	Arg	Leu	Leu	Ala	Leu	Phe	Gly	Gln	Val	Pro	Glu	Leu	Arg	2965	2970	2975
Thr	Ala	Val	Glu	Thr	Gly	Pro	Ala	Gly	Ala	Tyr	Trp	Lys	Asn	Thr	Leu	2980	2985	2990

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 Pro Val Phe Pro Tyr Ser Val Gly Leu Tyr Pro Gly Pro Thr Cys Met  
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Val	Gly	Gly	Ser	Ala	Val	Gly	Gly	Gly	Val	Thr	Pro	Trp	Val	Val	Ser		
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Ala	Lys	Ser	Ala	Ala	Ala	Leu	Asp	Ala	Gln	Ile	Glu	Arg	Leu	Ala	Ala		
2225				2230					2235						2240		
Phe	Ala	Ser	Arg	Asp	Arg	Thr	Asp	Asp	Ala	Asp	Ala	Gly	Ala	Val	Asp		
			2245					2250						2255			
Ala	Gly	Ala	Val	Ala	His	Val	Leu	Ala	Asp	Gly	Arg	Ala	Gln	Phe	Glu		
			2260					2265					2270				
His	Arg	Ala	Val	Ala	Leu	Gly	Ala	Gly	Ala	Asp	Asp	Leu	Val	Gln	Ala		
	2275					2280						2285					
Leu	Ala	Asp	Pro	Asp	Gly	Leu	Ile	Arg	Gly	Thr	Ala	Ser	Gly	Val	Gly		
	2290				2295					2300							
Arg	Val	Ala	Phe	Val	Phe	Pro	Gly	Gln	Gly	Thr	Gln	Trp	Ala	Gly	Met		
2305				2310						2315					2320		
Gly	Ala	Glu	Leu	Leu	Asp	Ser	Ser	Ala	Val	Phe	Ala	Ala	Ala	Met	Ala		
			2325					2330						2335			
Glu	Cys	Glu	Ala	Ala	Leu	Ser	Pro	Tyr	Val	Asp	Trp	Ser	Leu	Glu	Ala		
		2340						2345					2350				
Val	Val	Arg	Gln	Ala	Pro	Gly	Ala	Pro	Thr	Leu	Glu	Arg	Val	Asp	Val		
		2355					2360					2365					
Val	Gln	Pro	Val	Thr	Phe	Ala	Val	Met	Val	Ser	Leu	Ala	Arg	Val	Trp		
	2370					2375					2380						
Gln	His	His	Gly	Val	Thr	Pro	Gln	Ala	Val	Val	Gly	His	Ser	Gln	Gly		
2385				2390						2395					2400		
Glu	Ile	Ala	Ala	Ala	Tyr	Val	Ala	Gly	Ala	Leu	Pro	Leu	Asp	Asp	Ala		
			2405					2410						2415			
Ala	Arg	Val	Val	Thr	Leu	Arg	Ser	Lys	Ser	Ile	Ala	Ala	His	Leu	Ala		
			2420					2425						2430			

Gly	Lys	Gly	Gly	Met	Leu	Ser	Leu	Ala	Leu	Asn	Glu	Asp	Ala	Val	Leu	2435	2440	2445
Glu	Arg	Leu	Ser	Asp	Phe	Asp	Gly	Leu	Ser	Val	Ala	Ala	Val	Asn	Gly	2450	2455	2460
Pro	Thr	Ala	Thr	Val	Val	Ser	Gly	Asp	Pro	Val	Gln	Ile	Glu	Glu	Leu	2465	2470	2475
Ala	Gln	Ala	Cys	Lys	Ala	Asp	Gly	Phe	Arg	Ala	Arg	Ile	Ile	Pro	Val	2485	2490	2495
Asp	Tyr	Ala	Ser	His	Ser	Arg	Gln	Val	Glu	Ile	Ile	Glu	Ser	Glu	Leu	2500	2505	2510
Ala	Gln	Val	Leu	Ala	Gly	Leu	Ser	Pro	Gln	Ala	Pro	Arg	Val	Pro	Phe	2515	2520	2525
Phe	Ser	Thr	Leu	Glu	Gly	Thr	Trp	Ile	Thr	Glu	Pro	Val	Leu	Asp	Gly	2530	2535	2540
Thr	Tyr	Trp	Tyr	Arg	Asn	Leu	Arg	His	Arg	Val	Gly	Phe	Ala	Pro	Ala	2545	2550	2555
Ile	Glu	Thr	Leu	Ala	Val	Asp	Glu	Gly	Phe	Thr	His	Phe	Val	Glu	Val	2565	2570	2575
Ser	Ala	His	Pro	Val	Leu	Thr	Met	Thr	Leu	Pro	Glu	Thr	Val	Thr	Gly	2580	2585	2590
Leu	Gly	Thr	Leu	Arg	Arg	Glu	Gln	Gly	Gly	Gln	Glu	Arg	Leu	Val	Thr	2595	2600	2605
Ser	Leu	Ala	Glu	Ala	Trp	Val	Asn	Gly	Leu	Pro	Val	Ala	Trp	Thr	Ser	2610	2615	2620
Leu	Leu	Pro	Ala	Thr	Ala	Ser	Arg	Pro	Gly	Leu	Pro	Thr	Tyr	Ala	Phe	2625	2630	2635
Gln	Ala	Glu	Arg	Tyr	Trp	Leu	Glu	Asn	Thr	Pro	Ala	Ala	Leu	Ala	Thr	2645	2650	2655
Gly	Asp	Asp	Trp	Arg	Tyr	Arg	Ile	Asp	Trp	Lys	Arg	Leu	Pro	Ala	Ala	2660	2665	2670
Glu	Gly	Ser	Glu	Arg	Thr	Gly	Leu	Ser	Gly	Arg	Trp	Leu	Ala	Val	Thr	2675	2680	2685
Pro	Glu	Asp	His	Ser	Ala	Gln	Ala	Ala	Ala	Val	Leu	Thr	Ala	Leu	Val	2690	2695	2700
Asp	Ala	Gly	Ala	Lys	Val	Glu	Val	Leu	Thr	Ala	Gly	Ala	Asp	Asp	Asp	2705	2710	2715
Arg	Glu	Ala	Leu	Ala	Ala	Arg	Leu	Thr	Ala	Leu	Thr	Thr	Gly	Asp	Gly	2725	2730	2735
Phe	Thr	Gly	Val	Val	Ser	Leu	Leu	Asp	Gly	Leu	Val	Pro	Gln	Val	Ala	2740	2745	2750
Trp	Val	Gln	Ala	Leu	Gly	Asp	Ala	Gly	Ile	Lys	Ala	Pro	Leu	Trp	Ser	2755	2760	2765
Val	Thr	Gln	Gly	Ala	Val	Ser	Val	Gly	Arg	Leu	Asp	Thr	Pro	Ala	Asp	2770	2775	2780
Pro	Asp	Arg	Ala	Met	Leu	Trp	Gly	Leu	Gly	Arg	Val	Val	Ala	Leu	Glu	2785	2790	2795
His	Pro	Glu	Arg	Trp	Ala	Gly	Leu	Val	Asp	Leu	Pro	Ala	Gln	Pro	Asp	2805	2810	2815
Ala	Ala	Ala	Leu	Ala	His	Leu	Val	Thr	Ala	Leu	Ser	Gly	Ala	Thr	Gly	2820	2825	2830
Glu	Asp	Gln	Ile	Ala	Ile	Arg	Thr	Thr	Gly	Leu	His	Ala	Arg	Arg	Leu	2835	2840	2845
Ala	Arg	Ala	Pro	Leu	His	Gly	Arg	Arg	Pro	Thr	Arg	Asp	Trp	Gln	Pro	2850	2855	2860
His	Gly	Thr	Val	Leu	Ile	Thr	Gly	Gly	Thr	Gly	Ala	Leu	Gly	Ser	His	2865	2870	2875
Ala	Ala	Arg	Trp	Met	Ala	His	His	Gly	Ala	Glu	His	Leu	Leu	Leu	Val	2885	2890	2895
Ser	Arg	Ser	Gly	Glu	Gln	Ala	Pro	Gly	Ala	Thr	Gln	Leu	Thr	Ala	Glu	2900	2905	2910
Leu	Thr	Ala	Ser	Gly	Ala	Arg	Val	Thr	Ile	Ala	Ala	Cys	Asp	Val	Ala	2915	2920	2925

Asp Pro His Ala Met Arg Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr  
 2930 2935 2940  
 Pro Leu Thr Ala Val Val His Thr Ala Gly Ala Leu Asp Asp Gly Ile  
 2945 2950 2955 2960  
 Val Asp Thr Leu Thr Ala Glu Gln Val Arg Arg Ala His Arg Ala Lys  
 2965 2970 2975  
 Ala Val Gly Ala Ser Val Leu Asp Glu Leu Thr Arg Asp Leu Asp Leu  
 2980 2985 2990  
 Asp Ala Phe Val Leu Phe Ser Ser Val Ser Ser Thr Leu Gly Ile Pro  
 2995 3000 3005  
 Gly Gln Gly Asn Tyr Ala Pro His Asn Ala Tyr Leu Asp Ala Leu Ala  
 3010 3015 3020  
 Ala Arg Arg Arg Ala Thr Gly Arg Ser Ala Val Ser Val Ala Trp Gly  
 3025 3030 3035 3040  
 Pro Trp Asp Gly Gly Gly Met Ala Ala Gly Asp Gly Val Ala Glu Arg  
 3045 3050 3055  
 Leu Arg Asn His Gly Val Pro Gly Met Asp Pro Glu Leu Ala Leu Ala  
 3060 3065 3070  
 Ala Leu Glu Ser Ala Leu Gly Arg Asp Glu Thr Ala Ile Thr Val Ala  
 3075 3080 3085  
 Asp Ile Asp Trp Asp Arg Phe Tyr Leu Ala Tyr Ser Ser Gly Arg Pro  
 3090 3095 3100  
 Gln Pro Leu Val Glu Glu Leu Pro Glu Val Arg Arg Ile Ile Asp Ala  
 3105 3110 3115 3120  
 Arg Asp Ser Ala Thr Ser Gly Gln Gly Gly Ser Ser Ala Gln Gly Ala  
 3125 3130 3135  
 Asn Pro Leu Ala Glu Arg Leu Ala Ala Ala Pro Gly Glu Arg Thr  
 3140 3145 3150  
 Glu Ile Leu Leu Gly Leu Val Arg Ala Gln Ala Ala Ala Val Leu Arg  
 3155 3160 3165  
 Met Arg Ser Pro Glu Asp Val Ala Ala Asp Arg Ala Phe Lys Asp Ile  
 3170 3175 3180  
 Gly Phe Asp Ser Leu Ala Gly Val Glu Leu Arg Asn Arg Leu Thr Arg  
 3185 3190 3195 3200  
 Ala Thr Gly Leu Gln Leu Pro Ala Thr Leu Val Phe Asp His Pro Thr  
 3205 3210 3215  
 Pro Leu Ala Leu Val Ser Leu Leu Arg Ser Glu Phe Leu Gly Asp Glu  
 3220 3225 3230  
 Glu Thr Ala Asp Ala Arg Arg Ser Ala Ala Leu Pro Ala Thr Val Gly  
 3235 3240 3245  
 Ala Gly Ala Gly Ala Gly Ala Gly Thr Asp Ala Asp Asp Asp Pro Ile  
 3250 3255 3260  
 Ala Ile Val Ala Met Ser Cys Arg Tyr Pro Gly Asp Ile Arg Ser Pro  
 3265 3270 3275 3280  
 Glu Asp Leu Trp Arg Met Leu Ser Glu Gly Gly Glu Gly Ile Thr Pro  
 3285 3290 3295  
 Phe Pro Thr Asp Arg Gly Trp Asp Leu Asp Gly Leu Tyr Asp Ala Asp  
 3300 3305 3310  
 Pro Asp Ala Leu Gly Arg Ala Tyr Val Arg Glu Gly Gly Phe Leu His  
 3315 3320 3325  
 Asp Ala Ala Glu Phe Asp Ala Glu Phe Phe Gly Val Ser Pro Arg Glu  
 3330 3335 3340  
 Ala Leu Ala Met Asp Pro Gln Gln Arg Met Leu Leu Thr Thr Ser Trp  
 3345 3350 3355 3360  
 Glu Ala Phe Glu Arg Ala Gly Ile Glu Pro Ala Ser Leu Arg Gly Ser  
 3365 3370 3375  
 Ser Thr Gly Val Phe Ile Gly Leu Ser Tyr Gln Asp Tyr Ala Ala Arg  
 3380 3385 3390  
 Val Pro Asn Ala Pro Arg Gly Val Glu Gly Tyr Leu Leu Thr Gly Ser  
 3395 3400 3405  
 Thr Pro Ser Val Ala Ser Gly Arg Ile Ala Tyr Thr Phe Gly Leu Glu  
 3410 3415 3420

Gly	Pro	Ala	Thr	Thr	Val	Asp	Thr	Ala	Cys	Ser	Ser	Ser	Leu	Thr	Ala		
3425					3430					3435					3440		
Leu	His	Leu	Ala	Val	Arg	Ala	Leu	Arg	Ser	Gly	Glu	Cys	Thr	Met	Ala		
				3445					3450					3455			
Leu	Ala	Gly	Gly	Val	Ala	Met	Met	Ala	Thr	Pro	His	Met	Phe	Val	Glu		
			3460					3465					3470				
Phe	Ser	Arg	Gln	Arg	Ala	Leu	Ala	Pro	Asp	Gly	Arg	Ser	Lys	Ala	Phe		
		3475				3480					3485						
Ser	Ala	Asp	Ala	Asp	Gly	Phe	Gly	Ala	Ala	Glu	Gly	Val	Gly	Leu	Leu		
	3490				3495					3500							
Leu	Val	Glu	Arg	Leu	Ser	Asp	Ala	Arg	Arg	Asn	Gly	His	Pro	Val	Leu		
3505				3510						3515					3520		
Ala	Val	Val	Arg	Gly	Thr	Ala	Val	Asn	Gln	Asp	Gly	Ala	Ser	Asn	Gly		
			3525					3530						3535			
Leu	Thr	Ala	Pro	Asn	Gly	Pro	Ser	Gln	Gln	Arg	Val	Ile	Arg	Gln	Ala		
		3540				3545					3550						
Leu	Ala	Asp	Ala	Arg	Leu	Ala	Pro	Gly	Asp	Ile	Asp	Ala	Val	Glu	Thr		
		3555				3560					3565						
His	Gly	Thr	Gly	Thr	Ser	Leu	Gly	Asp	Pro	Ile	Glu	Ala	Gln	Gly	Leu		
	3570				3575					3580							
Gln	Ala	Thr	Tyr	Gly	Lys	Glu	Arg	Pro	Ala	Glu	Arg	Pro	Leu	Ala	Ile		
3585				3590						3595					3600		
Gly	Ser	Val	Lys	Ser	Asn	Ile	Gly	His	Thr	Gln	Ala	Ala	Ala	Gly	Ala		
			3605					3610						3615			
Ala	Gly	Ile	Ile	Lys	Met	Val	Leu	Ala	Met	Arg	His	Gly	Thr	Leu	Pro		
		3620				3625						3630					
Lys	Thr	Leu	His	Ala	Asp	Glu	Pro	Ser	Pro	His	Val	Asp	Trp	Ala	Asn		
	3635					3640					3645						
Ser	Gly	Leu	Ala	Leu	Val	Thr	Glu	Pro	Ile	Asp	Trp	Pro	Ala	Gly	Thr		
	3650				3655					3660							
Gly	Pro	Arg	Arg	Ala	Ala	Val	Ser	Ser	Phe	Gly	Ile	Ser	Gly	Thr	Asn		
3665				3670					3675					3680			
Ala	His	Val	Val	Leu	Glu	Gln	Ala	Pro	Asp	Ala	Ala	Gly	Glu	Val	Leu		
			3685					3690						3695			
Gly	Ala	Asp	Glu	Val	Pro	Glu	Val	Ser	Glu	Thr	Val	Ala	Met	Ala	Gly		
		3700				3705						3710					
Thr	Ala	Gly	Thr	Ser	Glu	Val	Ala	Glu	Gly	Ser	Glu	Ala	Ser	Glu	Ala		
	3715					3720					3725						
Pro	Ala	Ala	Pro	Gly	Ser	Arg	Glu	Ala	Ser	Leu	Pro	Gly	His	Leu	Pro		
	3730				3735					3740							
Trp	Val	Leu	Ser	Ala	Lys	Asp	Glu	Gln	Ser	Leu	Arg	Gly	Gln	Ala	Ala		
3745				3750					3755					3760			
Ala	Leu	His	Ala	Trp	Leu	Ser	Glu	Pro	Ala	Ala	Asp	Leu	Ser	Asp	Ala		
			3765					3770						3775			
Asp	Gly	Pro	Ala	Arg	Leu	Arg	Asp	Val	Gly	Tyr	Thr	Leu	Ala	Thr	Ser		
		3780					3785					3790					
Arg	Thr	Ala	Phe	Ala	His	Arg	Ala	Ala	Val	Thr	Ala	Ala	Asp	Arg	Asp		
	3795					3800					3805						
Gly	Phe	Leu	Asp	Gly	Leu	Ala	Thr	Leu	Ala	Gln	Gly	Gly	Thr	Ser	Ala		
	3810				3815					3820							
His	Val	His	Leu	Asp	Thr	Ala	Arg	Asp	Gly	Thr	Thr	Ala	Phe	Leu	Phe		
3825				3830					3835					3840			
Thr	Gly	Gln	Gly	Ser	Gln	Arg	Pro	Gly	Ala	Gly	Arg	Glu	Leu	Tyr	Asp		
			3845					3850					3855				
Arg	His	Pro	Val	Phe	Ala	Arg	Ala	Leu	Asp	Glu	Ile	Cys	Ala	His	Leu		
		3860				3865						3870					
Asp	Gly	His	Leu	Glu	Leu	Pro	Leu	Leu	Asp	Val	Met	Phe	Ala	Ala	Glu		
		3875				3880					3885						
Gly	Ser	Ala	Glu	Ala	Ala	Leu	Leu	Asp	Glu	Thr	Arg	Tyr	Thr	Gln	Cys		
	3890				3895				3900								
Ala	Leu	Phe	Ala	Leu	Glu	Val	Ala	Leu	Phe	Arg	Leu	Val	Glu	Ser	Trp		
3905				3910					3915					3920			

Gly Met Arg Pro Ala Ala Leu Leu Gly His Ser Val Gly Glu Ile Ala  
 3925 3930 3935  
 Ala Ala His Val Ala Gly Val Phe Ser Leu Ala Asp Ala Ala Arg Leu  
 3940 3945 3950  
 Val Ala Ala Arg Gly Arg Leu Met Gln Glu Leu Pro Ala Gly Gly Ala  
 3955 3960 3965  
 Met Leu Ala Val Gln Ala Ala Glu Asp Glu Ile Arg Val Trp Leu Glu  
 3970 3975 3980  
 Thr Glu Glu Arg Tyr Ala Gly Arg Leu Asp Val Ala Ala Val Asn Gly  
 3985 3990 3995 4000  
 Pro Glu Ala Ala Val Leu Ser Gly Asp Ala Asp Ala Ala Arg Glu Ala  
 4005 4010 4015  
 Glu Ala Tyr Trp Ser Gly Leu Gly Arg Arg Thr Arg Ala Leu Arg Val  
 4020 4025 4030  
 Ser His Ala Phe His Ser Ala His Met Asp Gly Met Leu Asp Gly Phe  
 4035 4040 4045  
 Arg Ala Val Leu Glu Thr Val Glu Phe Arg Arg Pro Ser Leu Thr Val  
 4050 4055 4060  
 Val Ser Asn Val Thr Gly Leu Ala Ala Gly Pro Asp Asp Leu Cys Asp  
 4065 4070 4075 4080  
 Pro Glu Tyr Trp Val Arg His Val Arg Gly Thr Val Arg Phe Leu Asp  
 4085 4090 4095  
 Gly Val Arg Val Leu Arg Asp Leu Gly Val Arg Thr Cys Leu Glu Leu  
 4100 4105 4110  
 Gly Pro Asp Gly Val Leu Thr Ala Met Ala Ala Asp Gly Leu Ala Asp  
 4115 4120 4125  
 Thr Pro Ala Asp Ser Ala Ala Gly Ser Pro Val Gly Ser Pro Ala Gly  
 4130 4135 4140  
 Ser Pro Ala Asp Ser Ala Ala Gly Ala Leu Arg Pro Arg Pro Leu Leu  
 4145 4150 4155 4160  
 Val Ala Leu Leu Arg Arg Lys Arg Ser Glu Thr Glu Thr Val Ala Asp  
 4165 4170 4175  
 Ala Leu Gly Arg Ala His Ala His Gly Thr Gly Pro Asp Trp His Ala  
 4180 4185 4190  
 Trp Phe Ala Gly Ser Gly Ala His Arg Val Asp Leu Pro Thr Tyr Ser  
 4195 4200 4205  
 Phe Arg Arg Asp Arg Tyr Trp Leu Asp Ala Pro Ala Ala Asp Thr Ala  
 4210 4215 4220  
 Val Asp Thr Ala Gly Leu Gly Leu Gly Thr Ala Asp His Pro Leu Leu  
 4225 4230 4235 4240  
 Gly Ala Val Val Ser Leu Pro Asp Arg Asp Gly Leu Leu Leu Thr Gly  
 4245 4250 4255  
 Arg Leu Ser Leu Arg Thr His Pro Trp Leu Ala Asp His Ala Val Leu  
 4260 4265 4270  
 Gly Ser Val Leu Leu Pro Gly Ala Ala Met Val Glu Leu Ala Ala His  
 4275 4280 4285  
 Ala Ala Glu Ser Ala Gly Leu Arg Asp Val Arg Glu Leu Thr Leu Leu  
 4290 4295 4300  
 Glu Pro Leu Val Leu Pro Glu His Gly Gly Val Glu Leu Arg Val Thr  
 4305 4310 4315 4320  
 Val Gly Ala Pro Ala Gly Glu Pro Gly Gly Glu Ser Ala Gly Asp Gly  
 4325 4330 4335  
 Ala Arg Pro Val Ser Leu His Ser Arg Leu Ala Asp Ala Pro Ala Gly  
 4340 4345 4350  
 Thr Ala Trp Ser Cys His Ala Thr Gly Leu Leu Ala Thr Asp Arg Pro  
 4355 4360 4365  
 Glu Leu Pro Val Ala Pro Asp Arg Ala Ala Met Trp Pro Pro Gln Gly  
 4370 4375 4380  
 Ala Glu Glu Val Pro Leu Asp Gly Leu Tyr Glu Arg Leu Asp Gly Asn  
 4385 4390 4395 4400  
 Gly Leu Ala Phe Gly Pro Leu Phe Gln Gly Leu Asn Ala Val Trp Arg  
 4405 4410 4415

Tyr Glu Gly Glu Val Phe Ala Asp Ile Ala Leu Pro Ala Thr Thr Asn  
 4420 4425 4430  
 Ala Thr Ala Pro Ala Thr Ala Asn Gly Gly Gly Ser Ala Ala Ala Ala  
 4435 4440 4445  
 Pro Tyr Gly Ile His Pro Ala Leu Leu Asp Ala Ser Leu His Ala Ile  
 4450 4455 4460  
 Ala Val Gly Gly Leu Val Asp Glu Pro Glu Leu Val Arg Val Pro Phe  
 4465 4470 4475 4480  
 His Trp Ser Gly Val Thr Val His Ala Ala Gly Ala Ala Ala Ala Arg  
 4485 4490 4495  
 Val Arg Leu Ala Ser Ala Gly Thr Asp Ala Val Ser Leu Ser Leu Thr  
 4500 4505 4510  
 Asp Gly Glu Gly Arg Pro Leu Val Ser Val Glu Arg Leu Thr Leu Arg  
 4515 4520 4525  
 Pro Val Thr Ala Asp Gln Ala Ala Ala Ser Arg Val Gly Gly Leu Met  
 4530 4535 4540  
 His Arg Val Ala Trp Arg Pro Tyr Ala Leu Ala Ser Ser Gly Glu Gln  
 4545 4550 4555 4560  
 Asp Pro His Ala Thr Ser Tyr Gly Pro Thr Ala Val Leu Gly Lys Asp  
 4565 4570 4575  
 Glu Leu Lys Val Ala Ala Ala Leu Glu Ser Ala Gly Val Glu Val Gly  
 4580 4585 4590  
 Leu Tyr Pro Asp Leu Ala Ala Leu Ser Gln Asp Val Ala Ala Gly Ala  
 4595 4600 4605  
 Pro Ala Pro Arg Thr Val Leu Ala Pro Leu Pro Ala Gly Pro Ala Asp  
 4610 4615 4620  
 Gly Gly Ala Glu Gly Val Arg Gly Thr Val Ala Arg Thr Leu Glu Leu  
 4625 4630 4635 4640  
 Leu Gln Ala Trp Leu Ala Asp Glu His Leu Ala Gly Thr Arg Leu Leu  
 4645 4650 4655  
 Leu Val Thr Arg Gly Ala Val Arg Asp Pro Glu Gly Ser Gly Ala Asp  
 4660 4665 4670  
 Asp Gly Gly Glu Asp Leu Ser His Ala Ala Ala Trp Gly Leu Val Arg  
 4675 4680 4685  
 Thr Ala Gln Thr Glu Asn Pro Gly Arg Phe Gly Leu Leu Asp Leu Ala  
 4690 4695 4700  
 Asp Asp Ala Ser Ser Tyr Arg Thr Leu Pro Ser Val Leu Ser Asp Ala  
 4705 4710 4715 4720  
 Gly Leu Arg Asp Glu Pro Gln Leu Ala Leu His Asp Gly Thr Ile Arg  
 4725 4730 4735  
 Leu Ala Arg Leu Ala Ser Val Arg Pro Glu Thr Gly Thr Ala Ala Pro  
 4740 4745 4750  
 Ala Leu Ala Pro Glu Gly Thr Val Leu Leu Thr Gly Gly Thr Gly Gly  
 4755 4760 4765  
 Leu Gly Gly Leu Val Ala Arg His Val Val Gly Glu Trp Gly Val Arg  
 4770 4775 4780  
 Arg Leu Leu Leu Val Ser Arg Arg Gly Thr Asp Ala Pro Gly Ala Asp  
 4785 4790 4795 4800  
 Glu Leu Val His Glu Leu Glu Ala Leu Gly Ala Asp Val Ser Val Ala  
 4805 4810 4815  
 Ala Cys Asp Val Ala Asp Arg Glu Ala Leu Thr Ala Val Leu Asp Ala  
 4820 4825 4830  
 Ile Pro Ala Glu His Pro Leu Thr Ala Val Val His Thr Ala Gly Val  
 4835 4840 4845  
 Leu Ser Asp Gly Thr Leu Pro Ser Met Thr Thr Glu Asp Val Glu His  
 4850 4855 4860  
 Val Leu Arg Pro Lys Val Asp Ala Ala Phe Leu Leu Asp Glu Leu Thr  
 4865 4870 4875 4880  
 Ser Thr Pro Ala Tyr Asp Leu Ala Ala Phe Val Met Phe Ser Ser Ala  
 4885 4890 4895  
 Ala Ala Val Phe Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Ala Asn  
 4900 4905 4910

Ala Thr Leu Asp Ala Leu Ala Trp Arg Arg Arg Ala Ala Gly Leu Pro  
 4915 4920 4925  
 Ala Leu Ser Leu Gly Trp Gly Leu Trp Ala Glu Thr Ser Gly Met Thr  
 4930 4935 4940  
 Gly Glu Leu Gly Gln Ala Asp Leu Arg Arg Met Ser Arg Ala Gly Ile  
 4945 4950 4955 4960  
 Gly Gly Ile Ser Asp Ala Glu Gly Ile Ala Leu Leu Asp Ala Ala Leu  
 4965 4970 4975  
 Arg Asp Asp Arg His Pro Val Leu Leu Pro Leu Arg Leu Asp Ala Ala  
 4980 4985 4990  
 Gly Leu Arg Asp Ala Ala Gly Asn Asp Pro Ala Gly Ile Pro Ala Leu  
 4995 5000 5005  
 Phe Arg Asp Val Val Gly Ala Arg Thr Val Arg Ala Arg Pro Ser Ala  
 5010 5015 5020  
 Ala Ser Ala Ser Thr Thr Ala Gly Thr Ala Gly Thr Pro Gly Thr Ala  
 5025 5030 5035 5040  
 Asp Gly Ala Ala Glu Thr Ala Ala Val Thr Leu Ala Asp Arg Ala Ala  
 5045 5050 5055  
 Thr Val Asp Gly Pro Ala Arg Gln Arg Leu Leu Leu Glu Phe Val Val  
 5060 5065 5070  
 Gly Glu Val Ala Glu Val Leu Gly His Ala Arg Gly His Arg Ile Asp  
 5075 5080 5085  
 Ala Glu Arg Gly Phe Leu Asp Leu Gly Phe Asp Ser Leu Thr Ala Val  
 5090 5095 5100  
 Glu Leu Arg Asn Arg Leu Asn Ser Ala Gly Gly Leu Ala Leu Pro Ala  
 5105 5110 5115 5120  
 Thr Leu Val Phe Asp His Pro Ser Pro Ala Ala Leu Ala Ser His Leu  
 5125 5130 5135  
 Asp Ala Glu Leu Pro Arg Gly Ala Ser Asp Gln Asp Gly Ala Gly Asn  
 5140 5145 5150  
 Arg Asn Gly Asn Glu Asn Gly Thr Thr Ala Ser Arg Ser Thr Ala Glu  
 5155 5160 5165  
 Thr Asp Ala Leu Leu Ala Gln Leu Thr Arg Leu Glu Gly Ala Leu Val  
 5170 5175 5180  
 Leu Thr Gly Leu Ser Asp Ala Pro Gly Ser Glu Glu Val Leu Glu His  
 5185 5190 5195 5200  
 Leu Arg Ser Leu Arg Ser Met Val Thr Gly Glu Thr Gly Thr Gly Thr  
 5205 5210 5215  
 Ala Ser Gly Ala Pro Asp Gly Ala Gly Ser Gly Ala Glu Asp Arg Pro  
 5220 5225 5230  
 Trp Ala Ala Gly Asp Gly Ala Gly Gly Gly Ser Glu Asp Gly Ala Gly  
 5235 5240 5245  
 Val Pro Asp Phe Met Asn Ala Ser Ala Glu Glu Leu Phe Gly Leu Leu  
 5250 5255 5260  
 Asp Gln Asp Pro Ser Thr Asp Met Ser Thr Val Asn Glu Glu Lys Tyr  
 5265 5270 5275 5280  
 Leu Asp Tyr Leu Arg Arg Ala Thr Ala Asp Leu His Glu Ala Arg Gly  
 5285 5290 5295  
 Arg Leu Arg Glu Leu Glu Ala Lys Ala Gly Glu Pro Val Ala Ile Val  
 5300 5305 5310  
 Gly Met Ala Cys Arg Leu Pro Gly Gly Val Ala Ser Pro Glu Asp Leu  
 5315 5320 5325  
 Trp Arg Leu Val Ala Gly Gly Glu Asp Ala Ile Ser Glu Phe Pro Gln  
 5330 5335 5340  
 Asp Arg Gly Trp Asp Val Glu Gly Leu Tyr Asp Pro Asn Pro Glu Ala  
 5345 5350 5355 5360  
 Thr Gly Lys Ser Tyr Ala Arg Glu Ala Gly Phe Leu Tyr Glu Ala Gly  
 5365 5370 5375  
 Glu Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala  
 5380 5385 5390  
 Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Ala Ser Trp Glu Ala Phe  
 5395 5400 5405



Glu	His	Ala	Gly	Ile	Pro	Ala	Ala	Thr	Ala	Arg	Gly	Thr	Ser	Val	Gly	5410	5415	5420
Val	Phe	Thr	Gly	Val	Met	Tyr	His	Asp	Tyr	Ala	Thr	Arg	Leu	Thr	Asp	5425	5430	5435
Val	Pro	Glu	Gly	Ile	Glu	Gly	Tyr	Leu	Gly	Thr	Gly	Asn	Ser	Gly	Ser	5445	5450	5455
Val	Ala	Ser	Gly	Arg	Val	Ala	Tyr	Thr	Leu	Gly	Leu	Glu	Gly	Pro	Ala	5460	5465	5470
Val	Thr	Val	Asp	Thr	Ala	Cys	Ser	Ser	Ser	Leu	Val	Ala	Leu	His	Leu	5475	5480	5485
Ala	Val	Gln	Ala	Leu	Arg	Lys	Gly	Glu	Val	Asp	Met	Ala	Leu	Ala	Gly	5490	5495	5500
Gly	Val	Thr	Val	Met	Ser	Thr	Pro	Ser	Thr	Phe	Val	Glu	Phe	Ser	Arg	5505	5510	5515
Gln	Arg	Gly	Leu	Ala	Pro	Asp	Gly	Arg	Ser	Lys	Ser	Phe	Ser	Ser	Thr	5525	5530	5535
Ala	Asp	Gly	Thr	Ser	Trp	Ser	Glu	Gly	Val	Gly	Val	Leu	Leu	Val	Glu	5540	5545	5550
Arg	Leu	Ser	Asp	Ala	Arg	Arg	Lys	Gly	His	Arg	Ile	Leu	Ala	Val	Val	5555	5560	5565
Arg	Gly	Thr	Ala	Val	Asn	Gln	Asp	Gly	Ala	Ser	Ser	Gly	Leu	Thr	Ala	5570	5575	5580
Pro	Asn	Gly	Pro	Ser	Gln	Gln	Arg	Val	Ile	Arg	Arg	Ala	Leu	Ala	Asp	5585	5590	5595
Ala	Arg	Leu	Thr	Thr	Ser	Asp	Val	Asp	Val	Val	Glu	Ala	His	Gly	Thr	5605	5610	5615
Gly	Thr	Arg	Leu	Gly	Asp	Pro	Ile	Glu	Ala	Gln	Ala	Val	Ile	Ala	Thr	5620	5625	5630
Tyr	Gly	Gln	Gly	Arg	Asp	Gly	Glu	Gln	Pro	Leu	Arg	Leu	Gly	Ser	Leu	5635	5640	5645
Lys	Ser	Asn	Ile	Gly	His	Thr	Gln	Ala	Ala	Ala	Gly	Val	Ser	Gly	Val	5650	5655	5660
Ile	Lys	Met	Val	Gln	Ala	Met	Arg	His	Gly	Val	Leu	Pro	Lys	Thr	Leu	5665	5670	5675
His	Val	Glu	Lys	Pro	Thr	Asp	Gln	Val	Asp	Trp	Ser	Ala	Gly	Ala	Val	5685	5690	5695
Glu	Leu	Leu	Thr	Glu	Ala	Met	Asp	Trp	Pro	Asp	Lys	Gly	Asp	Gly	Gly	5700	5705	5710
Leu	Arg	Arg	Ala	Ala	Val	Ser	Ser	Phe	Gly	Val	Ser	Gly	Thr	Asn	Ala	5715	5720	5725
His	Val	Val	Leu	Glu	Glu	Ala	Pro	Ala	Ala	Glu	Glu	Thr	Pro	Ala	Ser	5730	5735	5740
Glu	Ala	Thr	Pro	Ala	Val	Glu	Pro	Ser	Val	Gly	Ala	Gly	Leu	Val	Pro	5745	5750	5755
Trp	Leu	Val	Ser	Ala	Lys	Thr	Pro	Ala	Ala	Leu	Asp	Ala	Gln	Ile	Gly	5765	5770	5775
Arg	Leu	Ala	Ala	Phe	Ala	Ser	Gln	Gly	Arg	Thr	Asp	Ala	Ala	Asp	Pro	5780	5785	5790
Gly	Ala	Val	Ala	Arg	Val	Leu	Ala	Gly	Gly	Arg	Ala	Glu	Phe	Glu	His	5795	5800	5805
Arg	Ala	Val	Val	Leu	Gly	Thr	Gly	Gln	Asp	Asp	Phe	Ala	Gln	Ala	Leu	5810	5815	5820
Thr	Ala	Pro	Glu	Gly	Leu	Ile	Arg	Gly	Thr	Pro	Ser	Asp	Val	Gly	Arg	5825	5830	5835
Val	Ala	Phe	Val	Phe	Pro	Gly	Gln	Gly	Thr	Gln	Trp	Ala	Gly	Met	Gly	5845	5850	5855
Ala	Glu	Leu	Leu	Asp	Val	Ser	Lys	Glu	Phe	Ala	Ala	Ala	Met	Ala	Glu	5860	5865	5870
Cys	Glu	Ser	Ala	Leu	Ser	Arg	Tyr	Val	Asp	Trp	Ser	Leu	Glu	Ala	Val	5875	5880	5885
Val	Arg	Gln	Ala	Pro	Gly	Ala	Pro	Thr	Leu	Glu	Arg	Val	Asp	Val	Val	5890	5895	5900

Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Lys Val Trp Gln  
 5905 5910 5915 5920  
 His His Gly Val Thr Pro Gln Ala Val Val Gly His Ser Gln Gly Glu  
 5925 5930 5935  
 Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu Asp Asp Ala Ala  
 5940 5945 5950  
 Arg Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly  
 5955 5960 5965  
 Lys Gly Gly Met Ile Ser Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln  
 5970 5975 5980  
 Arg Ile Glu Asn Leu His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro  
 5985 5990 5995 6000  
 Thr Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala  
 6005 6010 6015  
 Gln Ala Cys Glu Ala Asp Gly Val Arg Ala Arg Ile Ile Pro Val Asp  
 6020 6025 6030  
 Tyr Ala Ser His Ser Ala His Val Glu Thr Ile Glu Ser Glu Leu Ala  
 6035 6040 6045  
 Glu Val Leu Ala Gly Leu Ser Pro Arg Thr Pro Glu Val Pro Phe Phe  
 6050 6055 6060  
 Ser Thr Leu Glu Gly Ala Trp Ile Thr Glu Pro Val Leu Asp Gly Thr  
 6065 6070 6075 6080  
 Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro Ala Val  
 6085 6090 6095  
 Glu Thr Leu Ala Thr Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser  
 6100 6105 6110  
 Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val Thr Gly Leu  
 6115 6120 6125  
 Gly Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu Val Thr Ser  
 6130 6135 6140  
 Leu Ala Glu Ala Trp Thr Asn Gly Leu Thr Ile Asp Trp Ala Pro Val  
 6145 6150 6155 6160  
 Leu Pro Thr Ala Thr Gly His His Pro Glu Leu Pro Thr Tyr Ala Phe  
 6165 6170 6175  
 Gln Arg Arg His Tyr Trp Leu His Asp Ser Pro Ala Val Gln Gly Ser  
 6180 6185 6190  
 Val Gln Asp Ser Trp Arg Tyr Arg Ile Asp Trp Lys Arg Leu Ala Val  
 6195 6200 6205  
 Ala Asp Ala Ser Glu Arg Ala Gly Leu Ser Gly Arg Trp Leu Val Val  
 6210 6215 6220  
 Val Pro Glu Asp Arg Ser Ala Glu Ala Ala Pro Val Leu Ala Ala Leu  
 6225 6230 6235 6240  
 Ser Gly Ala Gly Ala Asp Pro Val Gln Leu Asp Val Ser Pro Leu Gly  
 6245 6250 6255  
 Asp Arg Gln Arg Leu Ala Ala Thr Leu Gly Glu Ala Leu Ala Ala Ala  
 6260 6265 6270  
 Gly Gly Ala Val Asp Gly Val Leu Ser Leu Leu Ala Trp Asp Glu Ser  
 6275 6280 6285  
 Ala His Pro Gly His Pro Ala Pro Phe Thr Arg Gly Thr Gly Ala Thr  
 6290 6295 6300  
 Leu Thr Leu Val Gln Ala Leu Glu Asp Ala Gly Val Ala Ala Pro Leu  
 6305 6310 6315 6320  
 Trp Cys Val Thr His Gly Ala Val Ser Val Gly Arg Ala Asp His Val  
 6325 6330 6335  
 Thr Ser Pro Ala Gln Ala Met Val Trp Gly Met Gly Arg Val Ala Ala  
 6340 6345 6350  
 Leu Glu His Pro Glu Arg Trp Gly Gly Leu Ile Asp Leu Pro Ser Asp  
 6355 6360 6365  
 Ala Asp Arg Ala Ala Leu Asp Arg Met Thr Thr Val Leu Ala Gly Gly  
 6370 6375 6380  
 Thr Gly Glu Asp Gln Val Ala Val Arg Ala Ser Gly Leu Leu Ala Arg  
 6385 6390 6395 6400

Arg Leu Val Arg Ala Ser Leu Pro Ala His Gly Thr Ala Ser Pro Trp  
 6405 6410 6415  
 Trp Gln Ala Asp Gly Thr Val Leu Val Thr Gly Ala Glu Glu Pro Ala  
 6420 6425 6430  
 Ala Ala Glu Ala Ala Arg Arg Leu Ala Arg Asp Gly Ala Gly His Leu  
 6435 6440 6445  
 Leu Leu His Thr Thr Pro Ser Gly Ser Glu Gly Ala Glu Gly Thr Ser  
 6450 6455 6460  
 Gly Ala Ala Glu Asp Ser Gly Leu Ala Gly Leu Val Ala Glu Leu Ala  
 6465 6470 6475 6480  
 Asp Leu Gly Ala Thr Ala Thr Val Val Thr Cys Asp Leu Thr Asp Ala  
 6485 6490 6495  
 Glu Ala Ala Ala Arg Leu Leu Ala Gly Val Ser Asp Ala His Pro Leu  
 6500 6505 6510  
 Ser Ala Val Leu His Leu Pro Pro Thr Val Asp Ser Glu Pro Leu Ala  
 6515 6520 6525  
 Ala Thr Asp Ala Asp Ala Leu Ala Arg Val Val Thr Ala Lys Ala Thr  
 6530 6535 6540  
 Ala Ala Leu His Leu Asp Arg Leu Leu Arg Glu Ala Ala Ala Ala Gly  
 6545 6550 6555 6560  
 Gly Arg Pro Pro Val Leu Val Leu Phe Ser Ser Val Ala Ala Ile Trp  
 6565 6570 6575  
 Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Gly Thr Ala Phe Leu Asp  
 6580 6585 6590  
 Ala Leu Ala Gly Gln His Arg Ala Asp Gly Pro Thr Val Thr Ser Val  
 6595 6600 6605  
 Ala Trp Ser Pro Trp Glu Gly Ser Arg Val Thr Glu Gly Ala Thr Gly  
 6610 6615 6620  
 Glu Arg Leu Arg Arg Leu Gly Leu Arg Pro Leu Ala Pro Ala Thr Ala  
 6625 6630 6635 6640  
 Leu Thr Ala Leu Asp Thr Ala Leu Gly His Gly Asp Thr Ala Val Thr  
 6645 6650 6655  
 Ile Ala Asp Val Asp Trp Ser Ser Phe Ala Pro Gly Phe Thr Thr Ala  
 6660 6665 6670  
 Arg Pro Gly Thr Leu Leu Ala Asp Leu Pro Glu Ala Arg Arg Ala Leu  
 6675 6680 6685  
 Asp Glu Gln Gln Ser Thr Thr Ala Ala Asp Asp Thr Val Leu Ser Arg  
 6690 6695 6700  
 Glu Leu Gly Ala Leu Thr Gly Ala Glu Gln Gln Arg Arg Met Gln Glu  
 6705 6710 6715 6720  
 Leu Val Arg Glu His Leu Ala Val Val Leu Asn His Pro Ser Pro Glu  
 6725 6730 6735  
 Ala Val Asp Thr Gly Arg Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu  
 6740 6745 6750  
 Thr Ala Val Glu Leu Arg Asn Arg Leu Lys Asn Ala Thr Gly Leu Ala  
 6755 6760 6765  
 Leu Pro Ala Thr Leu Val Phe Asp Tyr Pro Thr Pro Arg Thr Leu Ala  
 6770 6775 6780  
 Glu Phe Leu Leu Ala Glu Ile Leu Gly Glu Gln Ala Gly Ala Gly Glu  
 6785 6790 6795 6800  
 Gln Leu Pro Val Asp Gly Gly Val Asp Asp Glu Pro Val Ala Ile Val  
 6805 6810 6815  
 Gly Met Ala Cys Arg Leu Pro Gly Gly Val Ala Ser Pro Glu Asp Leu  
 6820 6825 6830  
 Trp Arg Leu Val Ala Gly Gly Glu Asp Ala Ile Ser Gly Phe Pro Gln  
 6835 6840 6845  
 Asp Arg Gly Trp Asp Val Glu Gly Leu Tyr Asp Pro Asp Pro Asp Ala  
 6850 6855 6860  
 Ser Gly Arg Thr Tyr Cys Arg Ala Gly Gly Phe Leu Asp Glu Ala Gly  
 6865 6870 6875 6880  
 Glu Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala  
 6885 6890 6895

Met	Asp	Pro	Gln	Gln	Arg	Leu	Leu	Leu	Glu	Thr	Ser	Trp	Glu	Ala	Val	6900	6905	6910
Glu	Asp	Ala	Gly	Ile	Asp	Pro	Thr	Ser	Leu	Gln	Gly	Gln	Gln	Val	Gly	6915	6920	6925
Val	Phe	Ala	Gly	Thr	Asn	Gly	Pro	His	Tyr	Glu	Pro	Leu	Leu	Arg	Asn	6930	6935	6940
Thr	Ala	Glu	Asp	Leu	Glu	Gly	Tyr	Val	Gly	Thr	Gly	Asn	Ala	Ala	Ser	6945	6950	6955
Ile	Met	Ser	Gly	Arg	Val	Ser	Tyr	Thr	Leu	Gly	Leu	Glu	Gly	Pro	Ala	6965	6970	6975
Val	Thr	Val	Asp	Thr	Ala	Cys	Ser	Ser	Ser	Leu	Val	Ala	Leu	His	Leu	6980	6985	6990
Ala	Val	Gln	Ala	Leu	Arg	Lys	Gly	Glu	Cys	Gly	Leu	Ala	Leu	Ala	Gly	6995	7000	7005
Gly	Val	Thr	Val	Met	Ser	Thr	Pro	Thr	Thr	Phe	Val	Glu	Phe	Ser	Arg	7010	7015	7020
Gln	Arg	Gly	Leu	Ala	Glu	Asp	Gly	Arg	Ser	Lys	Ala	Phe	Ala	Ala	Ser	7025	7030	7035
Ala	Asp	Gly	Phe	Gly	Pro	Ala	Glu	Gly	Val	Gly	Met	Leu	Leu	Val	Glu	7045	7050	7055
Arg	Leu	Ser	Asp	Ala	Arg	Arg	Asn	Gly	His	Arg	Val	Leu	Ala	Val	Val	7060	7065	7070
Arg	Gly	Ser	Ala	Val	Asn	Gln	Asp	Gly	Ala	Ser	Asn	Gly	Leu	Thr	Ala	7075	7080	7085
Pro	Asn	Gly	Pro	Ser	Gln	Gln	Arg	Val	Ile	Arg	Arg	Ala	Leu	Ala	Asp	7090	7095	7100
Ala	Arg	Leu	Thr	Thr	Ala	Asp	Val	Asp	Val	Val	Glu	Ala	His	Gly	Thr	7105	7110	7115
Gly	Thr	Arg	Leu	Gly	Asp	Pro	Ile	Glu	Ala	Gln	Ala	Leu	Ile	Ala	Thr	7125	7130	7135
Tyr	Gly	Gln	Gly	Arg	Asp	Thr	Glu	Gln	Pro	Leu	Arg	Leu	Gly	Ser	Leu	7140	7145	7150
Lys	Ser	Asn	Ile	Gly	His	Thr	Gln	Ala	Ala	Ala	Gly	Val	Ser	Gly	Ile	7155	7160	7165
Ile	Lys	Met	Val	Gln	Ala	Met	Arg	His	Gly	Val	Leu	Pro	Lys	Thr	Leu	7170	7175	7180
His	Val	Asp	Arg	Pro	Ser	Asp	Gln	Ile	Asp	Trp	Ser	Ala	Gly	Thr	Val	7185	7190	7195
Glu	Leu	Leu	Thr	Glu	Ala	Met	Asp	Trp	Pro	Arg	Lys	Gln	Glu	Gly	Gly	7205	7210	7215
Leu	Arg	Arg	Ala	Ala	Val	Ser	Ser	Phe	Gly	Ile	Ser	Gly	Thr	Asn	Ala	7220	7225	7230
His	Ile	Val	Leu	Glu	Glu	Ala	Pro	Val	Asp	Glu	Asp	Ala	Pro	Ala	Asp	7235	7240	7245
Glu	Pro	Ser	Val	Gly	Gly	Val	Val	Pro	Trp	Leu	Val	Ser	Ala	Lys	Thr	7250	7255	7260
Pro	Ala	Ala	Leu	Asp	Ala	Gln	Ile	Gly	Arg	Leu	Ala	Ala	Phe	Ala	Ser	7265	7270	7275
Gln	Gly	Arg	Thr	Asp	Ala	Ala	Asp	Pro	Gly	Ala	Val	Ala	Arg	Val	Leu	7285	7290	7295
Ala	Gly	Gly	Arg	Ala	Gln	Phe	Glu	His	Arg	Ala	Val	Ala	Leu	Gly	Thr	7300	7305	7310
Gly	Gln	Asp	Asp	Leu	Ala	Ala	Ala	Leu	Ala	Ala	Pro	Glu	Gly	Leu	Val	7315	7320	7325
Arg	Gly	Val	Ala	Ser	Gly	Val	Gly	Arg	Val	Ala	Phe	Val	Phe	Pro	Gly	7330	7335	7340
Gln	Gly	Thr	Gln	Trp	Ala	Gly	Met	Gly	Ala	Glu	Leu	Leu	Asp	Val	Ser	7345	7350	7355
Lys	Glu	Phe	Ala	Ala	Ala	Met	Ala	Glu	Cys	Glu	Ala	Ala	Leu	Ala	Pro	7365	7370	7375
Tyr	Val	Asp	Trp	Ser	Leu	Glu	Ala	Val	Val	Arg	Gln	Ala	Pro	Gly	Ala	7380	7385	7390

Pro	Thr	Leu	Glu	Arg	Val	Asp	Val	Val	Gln	Pro	Val	Thr	Phe	Ala	Val		
		7395						7400					7405				
Met	Val	Ser	Leu	Ala	Lys	Val	Trp	Gln	His	His	Gly	Val	Thr	Pro	Gln		
		7410						7415				7420					
Ala	Val	Val	Gly	His	Ser	Gln	Gly	Glu	Ile	Ala	Ala	Ala	Tyr	Val	Ala		
		7425				7430				7435					7440		
Gly	Ala	Leu	Ser	Leu	Asp	Asp	Ala	Ala	Arg	Val	Val	Thr	Leu	Arg	Ser		
				7445					7450						7455		
Lys	Ser	Ile	Gly	Ala	His	Leu	Ala	Gly	Gln	Gly	Gly	Met	Leu	Ser	Leu		
			7460						7465						7470		
Ala	Leu	Ser	Glu	Ala	Ala	Val	Val	Glu	Arg	Leu	Ala	Gly	Phe	Asp	Gly		
		7475						7480					7485				
Leu	Ser	Val	Ala	Ala	Val	Asn	Gly	Pro	Thr	Ala	Thr	Val	Val	Ser	Gly		
		7490					7495					7500					
Asp	Pro	Thr	Gln	Ile	Gln	Glu	Leu	Ala	Gln	Ala	Cys	Glu	Ala	Asp	Gly		
		7505			7510					7515					7520		
Val	Arg	Ala	Arg	Ile	Ile	Pro	Val	Asp	Tyr	Ala	Ser	His	Ser	Ala	His		
				7525					7530						7535		
Val	Glu	Thr	Ile	Glu	Ser	Glu	Leu	Ala	Asp	Val	Leu	Ala	Gly	Leu	Ser		
			7540					7545					7550				
Pro	Gln	Thr	Pro	Gln	Val	Pro	Phe	Phe	Ser	Thr	Leu	Glu	Gly	Ala	Trp		
		7555					7560						7565				
Ile	Thr	Glu	Pro	Ala	Leu	Asp	Gly	Gly	Tyr	Trp	Tyr	Arg	Asn	Leu	Arg		
		7570				7575					7580						
His	Arg	Val	Gly	Phe	Ala	Pro	Ala	Val	Glu	Thr	Leu	Ala	Thr	Asp	Glu		
		7585			7590					7595					7600		
Gly	Phe	Thr	His	Phe	Val	Glu	Val	Ser	Ala	His	Pro	Val	Leu	Thr	Met		
			7605						7610					7615			
Ala	Leu	Pro	Glu	Thr	Val	Thr	Gly	Leu	Gly	Thr	Leu	Arg	Arg	Asp	Asn		
		7620					7625						7630				
Gly	Gly	Gln	His	Arg	Leu	Thr	Thr	Ser	Leu	Ala	Glu	Ala	Trp	Ala	Asn		
		7635					7640					7645					
Gly	Leu	Thr	Val	Asp	Trp	Ala	Ser	Leu	Leu	Pro	Thr	Thr	Thr	Thr	His		
		7650			7655					7660							
Pro	Asp	Leu	Pro	Thr	Tyr	Ala	Phe	Gln	Thr	Glu	Arg	Tyr	Trp	Pro	Gln		
		7665			7670					7675					7680		
Pro	Asp	Leu	Ser	Ala	Ala	Gly	Asp	Ile	Thr	Ser	Ala	Gly	Leu	Gly	Ala		
			7685					7690						7695			
Ala	Glu	His	Pro	Leu	Leu	Gly	Ala	Ala	Val	Ala	Leu	Ala	Asp	Ser	Asp		
		7700					7705						7710				
Gly	Cys	Leu	Leu	Thr	Gly	Ser	Leu	Ser	Leu	Arg	Thr	His	Pro	Trp	Leu		
		7715					7720					7725					
Ala	Asp	His	Ala	Val	Ala	Gly	Thr	Val	Leu	Leu	Pro	Gly	Thr	Ala	Phe		
		7730				7735					7740						
Val	Glu	Leu	Ala	Phe	Arg	Ala	Gly	Asp	Gln	Val	Gly	Cys	Asp	Leu	Val		
		7745			7750					7755					7760		
Glu	Glu	Leu	Thr	Leu	Asp	Ala	Pro	Leu	Val	Leu	Pro	Arg	Arg	Gly	Ala		
			7765					7770						7775			
Val	Arg	Val	Gln	Leu	Ser	Val	Gly	Ala	Ser	Asp	Glu	Ser	Gly	Arg	Arg		
		7780					7785						7790				
Thr	Phe	Gly	Leu	Tyr	Ala	His	Pro	Glu	Asp	Ala	Pro	Gly	Glu	Ala	Glu		
		7795					7800					7805					
Trp	Thr	Arg	His	Ala	Thr	Gly	Val	Leu	Ala	Ala	Arg	Ala	Asp	Arg	Thr		
		7810				7815					7820						
Ala	Pro	Val	Ala	Asp	Pro	Glu	Ala	Trp	Pro	Pro	Pro	Gly	Ala	Glu	Pro		
		7825			7830					7835					7840		
Val	Asp	Val	Asp	Gly	Leu	Tyr	Glu	Arg	Phe	Ala	Ala	Asn	Gly	Tyr	Gly		
			7845					7850						7855			
Tyr	Gly	Pro	Leu	Phe	Gln	Gly	Val	Arg	Gly	Val	Trp	Arg	Arg	Gly	Asp		
		7860						7865						7870			
Glu	Val	Phe	Ala	Asp	Val	Ala	Leu	Pro	Ala	Glu	Val	Ala	Gly	Ala	Glu		
		7875					7880						7885				

Gly	Ala	Arg	Phe	Gly	Leu	His	Pro	Ala	Leu	Leu	Asp	Ala	Ala	Val	Gln	7890	7895	7900	
Ala	Ala	Gly	Ala	Gly	Arg	Gly	Val	Arg	Arg	Gly	His	Ala	Ala	Ala	Val	7905	7910	7915	7920
Arg	Leu	Glu	Arg	Asp	Leu	Leu	Tyr	Ala	Val	Gly	Ala	Thr	Ala	Leu	Arg	7925	7930	7935	
Val	Arg	Leu	Ala	Pro	Ala	Gly	Pro	Asp	Thr	Val	Ser	Val	Ser	Ala	Ala	7940	7945	7950	
Asp	Ser	Ser	Gly	Gln	Pro	Val	Phe	Ala	Ala	Asp	Ser	Leu	Thr	Val	Leu	7955	7960	7965	
Pro	Val	Asp	Pro	Ala	Gln	Leu	Ala	Ala	Phe	Ser	Asp	Pro	Thr	Leu	Asp	7970	7975	7980	
Ala	Leu	His	Leu	Leu	Glu	Trp	Thr	Ala	Trp	Asp	Gly	Ala	Ala	Gln	Ala	7985	7990	7995	8000
Leu	Pro	Gly	Ala	Val	Val	Leu	Gly	Gly	Asp	Ala	Asp	Gly	Leu	Ala	Ala	8005	8010	8015	
Ala	Leu	Arg	Ala	Gly	Gly	Thr	Glu	Val	Leu	Ser	Phe	Pro	Asp	Leu	Thr	8020	8025	8030	
Asp	Leu	Val	Glu	Ala	Val	Asp	Arg	Gly	Glu	Thr	Pro	Ala	Pro	Ala	Thr	8035	8040	8045	
Val	Leu	Val	Ala	Cys	Pro	Ala	Ala	Gly	Pro	Asp	Gly	Pro	Glu	His	Val	8050	8055	8060	
Arg	Glu	Ala	Leu	His	Gly	Ser	Leu	Ala	Leu	Met	Gln	Ala	Trp	Leu	Ala	8065	8070	8075	8080
Asp	Glu	Arg	Phe	Thr	Asp	Gly	Arg	Leu	Val	Leu	Val	Thr	Arg	Asp	Ala	8085	8090	8095	
Val	Ala	Ala	Arg	Ser	Gly	Asp	Gly	Leu	Arg	Ser	Thr	Gly	Gln	Ala	Ala	8100	8105	8110	
Val	Trp	Gly	Leu	Gly	Arg	Ser	Ala	Gln	Thr	Glu	Ser	Pro	Gly	Arg	Phe	8115	8120	8125	
Val	Leu	Leu	Asp	Leu	Ala	Gly	Glu	Ala	Arg	Thr	Ala	Gly	Asp	Ala	Thr	8130	8135	8140	
Ala	Gly	Asp	Gly	Leu	Thr	Thr	Gly	Asp	Ala	Thr	Val	Gly	Gly	Thr	Ser	8145	8150	8155	8160
Gly	Asp	Ala	Ala	Leu	Gly	Ser	Ala	Leu	Ala	Thr	Ala	Leu	Gly	Ser	Gly	8165	8170	8175	
Glu	Pro	Gln	Leu	Ala	Leu	Arg	Asp	Gly	Ala	Leu	Leu	Val	Pro	Arg	Leu	8180	8185	8190	
Ala	Arg	Ala	Ala	Ala	Pro	Ala	Ala	Ala	Asp	Gly	Leu	Ala	Ala	Ala	Asp	8195	8200	8205	
Gly	Leu	Ala	Ala	Leu	Pro	Leu	Pro	Ala	Ala	Pro	Ala	Leu	Trp	Arg	Leu	8210	8215	8220	
Glu	Pro	Gly	Thr	Asp	Gly	Ser	Leu	Glu	Ser	Leu	Thr	Ala	Ala	Pro	Gly	8225	8230	8235	8240
Asp	Ala	Glu	Thr	Leu	Ala	Pro	Glu	Pro	Leu	Gly	Pro	Gly	Gln	Val	Arg	8245	8250	8255	
Ile	Ala	Ile	Arg	Ala	Thr	Gly	Leu	Asn	Phe	Arg	Asp	Val	Leu	Ile	Ala	8260	8265	8270	
Leu	Gly	Met	Tyr	Pro	Asp	Pro	Ala	Leu	Met	Gly	Thr	Glu	Gly	Ala	Gly	8275	8280	8285	
Val	Val	Thr	Ala	Thr	Gly	Pro	Gly	Val	Thr	His	Leu	Ala	Pro	Gly	Asp	8290	8295	8300	
Arg	Val	Met	Gly	Leu	Leu	Ser	Gly	Ala	Tyr	Ala	Pro	Val	Val	Val	Ala	8305	8310	8315	8320
Asp	Ala	Arg	Thr	Val	Ala	Arg	Met	Pro	Glu	Gly	Trp	Thr	Phe	Ala	Gln	8325	8330	8335	
Gly	Ala	Ser	Val	Pro	Val	Val	Phe	Leu	Thr	Ala	Val	Tyr	Ala	Leu	Arg	8340	8345	8350	
Asp	Leu	Ala	Asp	Val	Lys	Pro	Gly	Glu	Arg	Leu	Leu	Val	His	Ser	Ala	8355	8360	8365	
Ala	Gly	Gly	Val	Gly	Met	Ala	Ala	Val	Gln	Leu	Ala	Arg	His	Trp	Gly	8370	8375	8380	

Val	Glu	Val	His	Gly	Thr	Ala	Ser	His	Gly	Lys	Trp	Asp	Ala	Leu	Arg	8385	8390	8395	8400
Ala	Leu	Gly	Leu	Asp	Asp	Ala	His	Ile	Ala	Ser	Ser	Arg	Thr	Leu	Asp	8405	8410	8415	
Phe	Glu	Ser	Ala	Phe	Arg	Ala	Ala	Ser	Gly	Gly	Ala	Gly	Met	Asp	Val	8420	8425	8430	
Val	Leu	Asn	Ser	Leu	Ala	Arg	Glu	Phe	Val	Asp	Ala	Ser	Leu	Arg	Leu	8435	8440	8445	
Leu	Gly	Pro	Gly	Gly	Arg	Phe	Val	Glu	Met	Gly	Lys	Thr	Asp	Val	Arg	8450	8455	8460	
Asp	Ala	Glu	Arg	Val	Ala	Ala	Asp	His	Pro	Gly	Val	Gly	Tyr	Arg	Ala	8465	8470	8475	8480
Phe	Asp	Leu	Gly	Glu	Ala	Gly	Pro	Glu	Arg	Ile	Gly	Glu	Met	Leu	Ala	8485	8490	8495	
Glu	Val	Ile	Ala	Leu	Phe	Glu	Asp	Gly	Val	Leu	Arg	His	Leu	Pro	Val	8500	8505	8510	
Thr	Thr	Trp	Asp	Val	Arg	Arg	Ala	Arg	Asp	Ala	Phe	Arg	His	Val	Ser	8515	8520	8525	
Gln	Ala	Arg	His	Thr	Gly	Lys	Val	Val	Leu	Thr	Met	Pro	Ser	Gly	Leu	8530	8535	8540	
Asp	Pro	Glu	Gly	Thr	Val	Leu	Leu	Thr	Gly	Gly	Thr	Gly	Ala	Leu	Gly	8545	8550	8555	8560
Gly	Ile	Val	Ala	Arg	His	Val	Val	Gly	Glu	Trp	Gly	Val	Arg	Arg	Leu	8565	8570	8575	
Leu	Leu	Val	Ser	Arg	Arg	Gly	Thr	Asp	Ala	Pro	Gly	Ala	Gly	Glu	Leu	8580	8585	8590	
Val	His	Glu	Leu	Glu	Ala	Leu	Gly	Ala	Asp	Val	Ser	Val	Ala	Ala	Cys	8595	8600	8605	
Asp	Val	Ala	Asp	Arg	Glu	Ala	Leu	Thr	Ala	Val	Leu	Asp	Ser	Ile	Pro	8610	8615	8620	
Ala	Glu	His	Pro	Leu	Thr	Ala	Val	Val	His	Thr	Ala	Gly	Val	Leu	Ser	8625	8630	8635	8640
Asp	Gly	Thr	Leu	Pro	Ser	Met	Thr	Ala	Glu	Asp	Val	Glu	His	Val	Leu	8645	8650	8655	
Arg	Pro	Lys	Val	Asp	Ala	Ala	Phe	Leu	Leu	Asp	Glu	Leu	Thr	Ser	Thr	8660	8665	8670	
Pro	Gly	Tyr	Asp	Leu	Ala	Ala	Phe	Val	Met	Phe	Ser	Ser	Ala	Ala	Ala	8675	8680	8685	
Val	Phe	Gly	Gly	Ala	Gly	Gln	Gly	Ala	Tyr	Ala	Ala	Ala	Asn	Ala	Thr	8690	8695	8700	
Leu	Asp	Ala	Leu	Ala	Trp	Arg	Arg	Arg	Thr	Ala	Gly	Leu	Pro	Ala	Leu	8705	8710	8715	8720
Ser	Leu	Gly	Trp	Gly	Leu	Trp	Ala	Glu	Thr	Ser	Gly	Met	Thr	Gly	Gly	8725	8730	8735	
Leu	Ser	Asp	Thr	Asp	Arg	Ser	Arg	Leu	Ala	Arg	Ser	Gly	Ala	Thr	Pro	8740	8745	8750	
Met	Asp	Ser	Glu	Leu	Thr	Leu	Ser	Leu	Leu	Asp	Ala	Ala	Met	Arg	Arg	8755	8760	8765	
Asp	Asp	Pro	Ala	Leu	Val	Pro	Ile	Ala	Leu	Asp	Val	Ala	Ala	Leu	Arg	8770	8775	8780	
Ala	Gln	Gln	Arg	Asp	Gly	Met	Leu	Ala	Pro	Leu	Leu	Ser	Gly	Leu	Thr	8785	8790	8795	8800
Arg	Gly	Ser	Arg	Val	Gly	Gly	Ala	Pro	Val	Asn	Gln	Arg	Arg	Ala	Ala	8805	8810	8815	
Ala	Gly	Gly	Ala	Gly	Glu	Ala	Asp	Thr	Asp	Leu	Gly	Gly	Arg	Leu	Ala	8820	8825	8830	
Ala	Met	Thr	Pro	Asp	Asp	Arg	Val	Ala	His	Leu	Arg	Asp	Leu	Val	Arg	8835	8840	8845	
Thr	His	Val	Ala	Thr	Val	Leu	Gly	His	Gly	Thr	Pro	Ser	Arg	Val	Asp	8850	8855	8860	
Leu	Glu	Arg	Ala	Phe	Arg	Asp	Thr	Gly	Phe	Asp	Ser	Leu	Thr	Ala	Val	8865	8870	8875	8880

Glu	Leu	Arg	Asn	Arg	Leu	Asn	Ala	Ala	Thr	Gly	Leu	Arg	Leu	Pro	Ala		
				8885						8890				8895			
Thr	Leu	Val	Phe	Asp	His	Pro	Thr	Pro	Gly	Glu	Leu	Ala	Gly	His	Leu		
			8900					8905					8910				
Leu	Asp	Glu	Leu	Ala	Thr	Ala	Ala	Gly	Gly	Ser	Trp	Ala	Glu	Gly	Thr		
		8915					8920					8925					
Gly	Ser	Gly	Asp	Thr	Ala	Ser	Ala	Thr	Asp	Arg	Gln	Thr	Thr	Ala	Ala		
	8930					8935					8940						
Leu	Ala	Glu	Leu	Asp	Arg	Leu	Glu	Gly	Val	Leu	Ala	Ser	Leu	Ala	Pro		
8945				8950						8955					8960		
Ala	Ala	Gly	Gly	Arg	Pro	Glu	Leu	Ala	Ala	Arg	Leu	Arg	Ala	Leu	Ala		
				8965					8970					8975			
Ala	Ala	Leu	Gly	Asp	Asp	Gly	Asp	Asp	Ala	Thr	Asp	Leu	Asp	Glu	Ala		
			8980				8985						8990				
Ser	Asp	Asp	Asp	Leu	Phe	Ser	Phe	Ile	Asp	Lys	Glu	Leu	Gly	Asp	Ser		
	8995						9000					9005					
Asp	Phe	Met	Ala	Asn	Asn	Glu	Asp	Lys	Leu	Arg	Asp	Tyr	Leu	Lys	Arg		
	9010					9015					9020						
Val	Thr	Ala	Glu	Leu	Gln	Gln	Asn	Thr	Arg	Arg	Leu	Arg	Glu	Ile	Glu		
9025					9030					9035					9040		
Gly	Arg	Thr	His	Glu	Pro	Val	Ala	Ile	Val	Gly	Met	Ala	Cys	Arg	Leu		
			9045						9050					9055			
Pro	Gly	Gly	Val	Ala	Ser	Pro	Glu	Asp	Leu	Trp	Gln	Leu	Val	Ala	Gly		
			9060					9065					9070				
Asp	Gly	Asp	Ala	Ile	Ser	Glu	Phe	Pro	Gln	Asp	Arg	Gly	Trp	Asp	Val		
	9075						9080					9085					
Glu	Gly	Leu	Tyr	Asp	Pro	Asp	Pro	Asp	Ala	Ser	Gly	Arg	Thr	Tyr	Cys		
	9090					9095					9100						
Arg	Ser	Gly	Gly	Phe	Leu	His	Asp	Ala	Gly	Glu	Phe	Asp	Ala	Asp	Phe		
9105					9110					9115					9120		
Phe	Gly	Ile	Ser	Pro	Arg	Glu	Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg		
			9125						9130					9135			
Leu	Ser	Leu	Thr	Thr	Ala	Trp	Glu	Ala	Ile	Glu	Ser	Ala	Gly	Ile	Asp		
		9140						9145					9150				
Pro	Thr	Ala	Leu	Lys	Gly	Ser	Gly	Leu	Gly	Val	Phe	Val	Gly	Gly	Trp		
	9155						9160					9165					
His	Thr	Gly	Tyr	Thr	Ser	Gly	Gln	Thr	Thr	Ala	Val	Gln	Ser	Pro	Glu		
	9170					9175					9180						
Leu	Glu	Gly	His	Leu	Val	Ser	Gly	Ala	Ala	Leu	Gly	Phe	Leu	Ser	Gly		
9185					9190					9195					9200		
Arg	Ile	Ala	Tyr	Val	Leu	Gly	Thr	Asp	Gly	Pro	Ala	Leu	Thr	Val	Asp		
			9205						9210					9215			
Thr	Ala	Cys	Ser	Ser	Ser	Leu	Val	Ala	Leu	His	Leu	Ala	Val	Gln	Ala		
			9220					9225					9230				
Leu	Arg	Lys	Gly	Glu	Cys	Asp	Met	Ala	Leu	Ala	Gly	Gly	Val	Thr	Val		
		9235					9240					9245					
Met	Pro	Asn	Ala	Asp	Leu	Phe	Val	Gln	Phe	Ser	Arg	Gln	Arg	Gly	Leu		
	9250					9255					9260						
Ala	Ala	Asp	Gly	Arg	Ser	Lys	Ala	Phe	Ala	Thr	Ser	Ala	Asp	Gly	Phe		
9265					9270					9275					9280		
Gly	Pro	Ala	Glu	Gly	Ala	Gly	Val	Leu	Leu	Val	Glu	Arg	Leu	Ser	Asp		
			9285						9290					9295			
Ala	Arg	Arg	Asn	Gly	His	Arg	Ile	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala		
			9300					9305					9310				
Val	Asn	Gln	Asp	Gly	Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	His	Gly	Pro		
	9315						9320					9325					
Ser	Gln	Gln	Arg	Val	Ile	Arg	Arg	Ala	Leu	Ala	Asp	Ala	Arg	Leu	Ala		
	9330					9335					9340						
Pro	Gly	Asp	Val	Asp	Val	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Arg	Leu		
9345				9350						9355					9360		
Gly	Asp	Pro	Ile	Glu	Ala	Gln	Ala	Leu	Ile	Ala	Thr	Tyr	Gly	Gln	Glu		
			9365						9370					9375			



Lys Ser Ser Glu Gln Pro Leu Arg Leu Gly Ala Leu Lys Ser Asn Ile  
 9380 9385 9390  
 Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val  
 9395 9400 9405  
 Gln Ala Met Arg His Gly Leu Leu Pro Lys Thr Leu His Val Asp Glu  
 9410 9415 9420  
 Pro Ser Asp Gln Ile Asp Trp Ser Ala Gly Thr Val Glu Leu Leu Thr  
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 Glu Ala Val Asp Trp Pro Glu Lys Gln Asp Gly Gly Leu Arg Arg Ala  
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 Glu Glu Ala Pro Ala Val Glu Asp Ser Pro Ala Val Glu Pro Pro Ala  
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 Leu Asp Ala Gln Ile Gly Gln Leu Ala Ala Tyr Ala Asp Gly Arg Thr  
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 Ser Met Ala Glu Cys Glu Thr Ala Leu Ser Arg Tyr Val Asp Trp Ser  
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 Leu Glu Ala Val Val Arg Gln Glu Pro Gly Ala Pro Thr Leu Asp Arg  
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 Val Asp Val Val Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala  
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 Lys Val Trp Gln His His Gly Ile Thr Pro Gln Ala Val Val Gly His  
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 Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu  
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 Ile Pro Val Asp Tyr Ala Ser His Ser Arg Gln Val Glu Ile Ile Glu  
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 Lys Glu Leu Ala Glu Val Leu Ala Gly Leu Ala Pro Gln Ala Pro His  
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Val Thr Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu Thr Ile Asp Trp  
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Ala Val Ser Val Gly Arg Leu Asp Thr Pro Ala Asp Pro Asp Arg Ala  
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Met Leu Trp Gly Leu Gly Arg Val Val Ala Leu Glu His Pro Glu Arg  
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Trp Ala Gly Leu Val Asp Leu Pro Ala Gln Pro Asp Ala Ala Ala Leu  
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Met Ala His His Gly Ala Glu His Leu Leu Leu Val Ser Arg Ser Gly  
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Met Arg Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr Pro Leu Thr Ala  
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Gly Pro Glu Asp Ile Ala Arg Ile Leu Gly Ala Lys Thr Ser Gly Ala  
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Ile Arg Pro Met Ser Pro Asp Arg Ala Leu Asp Glu Leu Ala Lys Ala  
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Arg Phe Ala Pro Ala Phe Thr Val Ser Arg Pro Ser Leu Leu Asp  
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 Asp Arg Val Ala Pro Gly Arg Ala Phe Thr Glu Leu Gly Phe Asp Ser  
 10435 10440 10445  
 Leu Thr Ala Val Gln Leu Arg Asn Gln Leu Ser Thr Val Val Gly Asn  
 10450 10455 10460  
 Arg Leu Pro Ala Thr Thr Val Phe Asp His Pro Thr Pro Ala Ala Leu  
 10465 10470 10475 10480  
 Ala Ala His Leu His Glu Ala Tyr Leu Ala Pro Ala Glu Pro Ala Pro  
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 Thr Asp Trp Glu Gly Arg Val Arg Arg Ala Leu Ala Glu Leu Pro Leu  
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 Gly Ile Glu Pro Glu Pro Gly Ser Gly Gly Ser Asp Gly Gly Ala Ala  
 10530 10535 10540  
 Asp Pro Gly Ala Glu Pro Glu Ala Ser Ile Asp Asp Leu Asp Ala Glu  
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 Ala Leu Ile Arg Met Ala Leu Gly Pro Arg Asn Thr Met Thr Ser Ser  
 10565 10570 10575  
 Asn Glu Gln Leu Val Asp Ala Leu Arg Ala Ser Leu Lys Glu Asn Glu  
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 Glu Leu Arg Lys Glu Ser Arg Arg Arg Ala Asp Arg Arg Gln Glu Pro  
 10595 10600 10605  
 Met Ala Ile Val Gly Met Ser Cys Arg Phe Ala Gly Gly Ile Arg Ser  
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 Pro Glu Asp Leu Trp Asp Ala Val Ala Ala Gly Lys Asp Leu Val Ser  
 10625 10630 10635 10640  
 Glu Val Pro Glu Glu Arg Gly Trp Asp Ile Asp Ser Leu Tyr Asp Pro  
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 Val Pro Gly Arg Lys Gly Thr Thr Tyr Val Arg Asn Ala Ala Phe Leu  
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 Trp Glu Val Phe Glu Arg Ala Gly Ile Asp Pro Ala Ser Val Arg Gly  
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 Asp Ile Arg Val Ala Pro Glu Gly Thr Gly Gly Tyr Val Val Thr Gly  
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 Asn Ser Ser Ala Val Ala Ser Gly Arg Ile Ala Tyr Ser Leu Gly Leu  
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 10770 10775 10780  
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 Glu Phe Ser Ser Gln Gln Ala Met Ala Ala Asp Gly Arg Thr Lys Gly  
 10820 10825 10830  
 Phe Ala Ser Ala Ala Asp Gly Leu Ala Trp Gly Glu Gly Val Ala Val  
 10835 10840 10845  
 Leu Leu Leu Glu Arg Leu Ser Asp Ala Arg Arg Lys Gly His Arg Val  
 10850 10855 10860

Leu Ala Val Val Arg Gly Ser Ala Ile Asn Gln Asp Gly Ala Ser Asn  
 10865 10870 10875 10880  
 Gly Leu Thr Ala Pro His Gly Pro Ser Gln Gln His Leu Ile Arg Gln  
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 Ala Leu Ala Asp Ala Arg Leu Thr Ser Ser Asp Val Asp Val Val Glu  
 10900 10905 10910  
 Gly His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala  
 10915 10920 10925  
 Leu Leu Ala Thr Tyr Gly Gln Gly Arg Ala Pro Gly Gln Pro Leu Arg  
 10930 10935 10940  
 Leu Gly Thr Leu Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ser Gly  
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 Val Ala Gly Val Ile Lys Met Val Gln Ala Leu Arg His Gly Val Leu  
 10965 10970 10975  
 Pro Lys Thr Leu His Val Asp Glu Pro Thr Asp Gln Val Asp Trp Ser  
 10980 10985 10990  
 Ala Gly Ser Val Glu Leu Leu Thr Glu Ala Val Asp Trp Pro Glu Arg  
 10995 11000 11005  
 Pro Gly Arg Leu Arg Arg Ala Gly Val Ser Ala Phe Gly Val Gly Gly  
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 Thr Asn Ala His Val Val Leu Glu Glu Ala Pro Ala Val Glu Glu Ser  
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 Pro Ala Val Glu Pro Pro Ala Gly Gly Gly Val Val Pro Trp Pro Val  
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 Ser Ala Lys Thr Ser Ala Ala Leu Asp Ala Gln Ile Gly Gln Leu Ala  
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 Ala Tyr Ala Glu Asp Arg Thr Asp Val Asp Pro Ala Val Ala Ala Arg  
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 Ser Ala Pro Thr Leu Asp Arg Val Asp Val Val Gln Pro Val Thr Phe  
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 Ala Val Met Val Ser Leu Ala Lys Val Trp Gln His His Gly Ile Thr  
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 Pro Glu Ala Val Ile Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr  
 11220 11225 11230  
 Val Ala Gly Ala Leu Thr Leu Asp Asp Ala Ala Arg Val Val Thr Leu  
 11235 11240 11245  
 Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly Lys Gly Gly Met Ile  
 11250 11255 11260  
 Ser Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln Arg Ile Glu Asn Leu  
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 His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val  
 11285 11290 11295  
 Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln Ala Cys Glu Ala  
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 Asp Gly Ile Arg Ala Arg Ile Ile Pro Val Asp Tyr Ala Ser His Ser  
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 Ala His Val Glu Thr Ile Glu Asn Glu Leu Ala Asp Val Leu Ala Gly  
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 Leu Ser Pro Gln Thr Pro Gln Val Pro Phe Phe Ser Thr Leu Glu Gly  
 11345 11350 11355 11360

Thr Trp Ile Thr Glu Pro Ala Leu Asp Gly Gly Tyr Trp Tyr Arg Asn  
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 Leu Arg His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr  
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 Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser Ala His Pro Val Leu  
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 Thr Met Thr Leu Pro Asp Lys Val Thr Gly Leu Ala Thr Leu Arg Arg  
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 Glu Asp Gly Gly Gln His Arg Leu Thr Thr Ser Leu Ala Glu Ala Trp  
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 Ala Asn Gly Leu Ala Leu Asp Trp Ala Ser Leu Leu Pro Ala Thr Gly  
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 Ala Leu Ser Pro Ala Val Pro Asp Leu Pro Thr Tyr Ala Phe Gln His  
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 Arg Ser Tyr Trp Ile Ser Pro Ala Gly Pro Gly Glu Ala Pro Ala His  
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 Ala Met Val Met Arg Gln Ala Ala Ser Val Leu Arg Cys Asp Ser Pro  
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 Leu Thr Ala Val Asp Phe Arg Asn Arg Val Asn Arg Leu Thr Gly Leu  
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 Gln Leu Pro Pro Thr Val Val Phe Gln His Pro Thr Pro Val Ala Leu  
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 11585 11590 11595 11600  
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 Pro Glu Ala Cys Ser Glu Arg Leu Asp Pro Val Leu Leu Ala Gly Gly  
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 Pro Val Val Leu Leu Gly His Ser Gly Gly Ala Leu Leu Ala His Glu  
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 Leu Ala Phe Arg Leu Glu Arg Ala His Gly Ala Pro Pro Ala Gly Ile  
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Ala Ser Glu Pro Leu Gly Asp Trp Gln Glu Glu Arg Gly Asp Trp Arg  
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Ala His Trp Asp Leu Pro His Thr Val Ala Asp Val Pro Gly Asp His  
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Phe Thr Met Met Arg Asp His Ala Pro Ala Val Ala Glu Ala Val Leu  
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Ser Trp Leu Asp Ala Ile Glu Gly Ile Glu Gly Ala Gly Lys Met Thr  
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Asp Arg Pro Leu Asn Val Asp Ser Gly Leu Trp Ile Arg Arg Phe His  
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Arg His Gly Val Arg Pro Glu Gly Leu Tyr Val Ser Gly Arg Arg Ala  
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Pro Ser Leu Ala Pro Asp Arg Leu Val His Gln Leu Asp Asp Arg Ala  
12050 12055 12060  
Phe Leu Ala Glu Ile Arg Arg Leu Ser Gly Thr Asp Glu Arg Phe Leu  
12065 12070 12075 12080  
Gln Asp Asp Glu Leu Leu Arg Leu Val Leu Pro Ala Leu Arg Ser Asp  
12085 12090 12095  
Tyr Lys Ala Ala Glu Thr Tyr Leu His Arg Pro Ser Ala Lys Leu Thr  
12100 12105 12110  
Cys Pro Val Met Ala Leu Ala Gly Asp Arg Asp Pro Lys Ala Pro Leu  
12115 12120 12125  
Asn Glu Val Ala Glu Trp Arg Arg His Thr Ser Gly Pro Phe Cys Leu  
12130 12135 12140  
Arg Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn Asp Gln Trp His Glu  
12145 12150 12155 12160  
Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val Thr Arg Gly Ala Pro  
12165 12170 12175  
Asp Ala Arg Val Val Gln Pro Pro Thr Ser Leu Ile Glu Gly Ala Ala  
12180 12185 12190  
Lys Arg Trp Gln Asn Pro Arg  
12195

<210> 7

<211> 1248

<212> DNA

<213> *Streptomyces venezuelae*

<400> 7

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gccctcgaca	gccagtggct	gtccaacggc	ggcccgtctg	tccgagagtt	cgaggagcgc	180
gtcgccgggg	tcgcccgggt	ccggcatgcc	gtggccacct	gcaacgccac	ggccggggtc	240
cagctcctcg	cgcacgccgc	cggcctcacc	ggcgaagtga	tcatgccgtc	gatgacgttc	300
gcccgcaccc	cgcacgcact	gcgctggatc	ggcctcacc	cggtcttcgc	cgacatcgac	360
ccggacaccg	gcaacctcga	cccggaccag	gtggccgccc	cggtcacacc	ccgcacctcg	420
gccgtcgtcg	gcgtccacct	ctggggccgc	ccctgcgcgc	ccgaccagct	gcggaaggtc	480
gccgacgagc	acggcctgcg	gctgtacttc	gacgccgcgc	acgccctcgg	ctgcccggtc	540
gacggccggc	ccggccggcag	cctcggcgcac	gccgaggtct	tcagcttcca	cgccaccaag	600

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gccgtcaacg ccttcgaggg cggcgccgctc gtcaccgacg acgcccacct cggcgcccg 660
atccgcgccc tccacaactt cggcttcgac ctgcccggcg gcagccccgc cggcgggacc 720
aacgccaaga tgagcgaggc cggcgccgccc atgggcctca cctccctcga cgcgtttccc 780
gaggtcatcg accggaaccg gcgcaaccac gccgcctacc gcgagcacct cgcggacctc 840
cccgggcgcc tcgtcgccga ccacgaccgc caccggcctca acaaccacca gtacgtgatc 900
gtcgagatcg acgaggccac caccggcatc caccgcgacc tcgtcatgga ggtcctgaag 960
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ctgccgaccg gcaccgccat cggcgacgac gacatccgcc gggtcgccga cctgctgcgt 1140
ctctgcgcga cccgcggccg cgaactgacc gcgcgccacc gcgacacggc ccccgccccg 1200
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<210> 8

<211> 415

<212> PRT

<213> Streptomyces venezuelae

<400> 8

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20     25     30
Arg Leu Tyr Glu Arg Leu Asp Arg Ala Leu Asp Ser Gln Trp Leu Ser
35     40     45
Asn Gly Gly Pro Leu Val Arg Glu Phe Glu Glu Arg Val Ala Gly Leu
50     55     60
Ala Gly Val Arg His Ala Val Ala Thr Cys Asn Ala Thr Ala Gly Leu
65     70     75     80
Gln Leu Leu Ala His Ala Ala Gly Leu Thr Gly Glu Val Ile Met Pro
85     90     95
Ser Met Thr Phe Ala Ala Thr Pro His Ala Leu Arg Trp Ile Gly Leu
100    105    110
Thr Pro Val Phe Ala Asp Ile Asp Pro Asp Thr Gly Asn Leu Asp Pro
115    120    125
Asp Gln Val Ala Ala Ala Val Thr Pro Arg Thr Ser Ala Val Val Gly
130    135    140
Val His Leu Trp Gly Arg Pro Cys Ala Ala Asp Gln Leu Arg Lys Val
145    150    155    160
Ala Asp Glu His Gly Leu Arg Leu Tyr Phe Asp Ala Ala His Ala Leu
165    170    175
Gly Cys Ala Val Asp Gly Arg Pro Ala Gly Ser Leu Gly Asp Ala Glu
180    185    190
Val Phe Ser Phe His Ala Thr Lys Ala Val Asn Ala Phe Glu Gly Gly
195    200    205
Ala Val Val Thr Asp Asp Ala Asp Leu Ala Ala Arg Ile Arg Ala Leu
210    215    220
His Asn Phe Gly Phe Asp Leu Pro Gly Gly Ser Pro Ala Gly Gly Thr
225    230    235    240
Asn Ala Lys Met Ser Glu Ala Ala Ala Ala Met Gly Leu Thr Ser Leu
245    250    255
Asp Ala Phe Pro Glu Val Ile Asp Arg Asn Arg Arg Asn His Ala Ala
260    265    270
Tyr Arg Glu His Leu Ala Asp Leu Pro Gly Val Leu Val Ala Asp His
275    280    285
Asp Arg His Gly Leu Asn Asn His Gln Tyr Val Ile Val Glu Ile Asp
290    295    300
Glu Ala Thr Thr Gly Ile His Arg Asp Leu Val Met Glu Val Leu Lys
305    310    315    320
Ala Glu Gly Val His Thr Arg Ala Tyr Phe Ser Pro Gly Cys His Glu
325    330    335
Leu Glu Pro Tyr Arg Gly Gln Pro His Ala Pro Leu Pro His Thr Glu
340    345    350

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Arg Leu Ala Ala Arg Val Leu Ser Leu Pro Thr Gly Thr Ala Ile Gly  
 355 360 365  
 Asp Asp Asp Ile Arg Arg Val Ala Asp Leu Leu Arg Leu Cys Ala Thr  
 370 375 380  
 Arg Gly Arg Glu Leu Thr Ala Arg His Arg Asp Thr Ala Pro Ala Pro  
 385 390 395 400  
 Leu Ala Ala Pro Gln Thr Ser Thr Pro Thr Ile Gly Arg Ser Arg  
 405 410 415

<210> 9  
 <211> 1458  
 <212> DNA  
 <213> Streptomyces venezuelae

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 cccgacgagg ccggaacgac cgcccgccac ctcgctcggc tcgccgtgcg ctacggcaac 180  
 agccccttca ccccgctgga ggaggcccgc cagaccttgg gcgtcgaccg ggacgccttc 240  
 cggcgccctc tcgccctgtt cgggcaggtc ccggagctcc gcaccgcggt cgagaccggc 300  
 cccgccgggg cgtactggaa gaacaccctg ctcccgtcgc aacagcgcgg cgtcttcgac 360  
 gcggcgctcg ccaggaagcc cgtcttcccg tacagcgtcg gcctctacc cggcccgcacc 420  
 tgcatgttcc gctgccactt ctgcgtccgt gtgaccggcg cccgctacga cccgtccgcc 480  
 ctgcagcggc gcaacgccat gttccggtcg gtcacgcag agataccgc gggcaacccc 540  
 tcggcgatgt acttctccgg cggcctggag ccgctcacca accccggcct cgggagcctg 600  
 gccgcgcacg ccaccgacca cggcctgcgg ccacccgtct acacgaactc cttcgcgctc 660  
 accgagcgca ccctggagcg ccagcccggc ctctggggcc tgcacgccat ccgcacctcg 720  
 ctctacggcc tcaacgacga ggagtacgag cagaccaccg gcaagaaggc cgccttcgcg 780  
 cgcgtccgcg agaacctgcg ccgcttccag cagctgcgcg ccgagcgcga gtcgccgatc 840  
 aacctcggct tcgcctacat cgtgctcccg ggccgtgcct cccgcctgct cgacctggtc 900  
 gacttcatcg ccgacctcaa cgacgccggg cagggcagga cgatcgactt cgtcaacatt 960  
 cgcgaggact acagcggccg tgacgacggc aagctgccgc aggaggagcg ggccgagctc 1020  
 caggaggccc tcaacgcctt cgaggagcgg gtccgcgagc gcacccccgg actccacatc 1080  
 gactacggct acgcctgaa cagcctgcgc accggggccg acgccgaact gctgcggatc 1140  
 aagcccggca caatcgcgcc caccgcgcac ccgcaggctc cgggtgcagg cgatctcctc 1200  
 ggcgacgtgt acctgtaccg cgaggccggc ttccccgacc tggacggcgc gacccgctac 1260  
 atcgcgggcc gcgtgacccc cgacacctcc ctaccgagg tcgtcaggga cttcgtcgag 1320  
 cgcggcggcg aggtggcggc cgtcgacggc gacgagtact tcatggacgg cttcgatcag 1380  
 gtcgtcaccg cccgcctgaa ccagctggag cgcgacgccg cggacggctg ggaggaggcc 1440  
 cgcggtcttc tgcgtga 1458

<210> 10  
 <211> 485  
 <212> PRT  
 <213> Streptomyces venezuelae

<400> 10  
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 20 25 30  
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 35 40 45  
 Arg His Leu Val Arg Leu Ala Val Arg Tyr Gly Asn Ser Pro Phe Thr  
 50 55 60  
 Pro Leu Glu Glu Ala Arg His Asp Leu Gly Val Asp Arg Asp Ala Phe  
 65 70 75 80  
 Arg Arg Leu Leu Ala Leu Phe Gly Gln Val Pro Glu Leu Arg Thr Ala  
 85 90 95  
 Val Glu Thr Gly Pro Ala Gly Ala Tyr Trp Lys Asn Thr Leu Leu Pro  
 100 105 110



Leu Glu Gln Arg Gly Val Phe Asp Ala Ala Leu Ala Arg Lys Pro Val  
 115 120 125  
 Phe Pro Tyr Ser Val Gly Leu Tyr Pro Gly Pro Thr Cys Met Phe Arg  
 130 135 140  
 Cys His Phe Cys Val Arg Val Thr Gly Ala Arg Tyr Asp Pro Ser Ala  
 145 150 155 160  
 Leu Asp Ala Gly Asn Ala Met Phe Arg Ser Val Ile Asp Glu Ile Pro  
 165 170 175  
 Ala Gly Asn Pro Ser Ala Met Tyr Phe Ser Gly Gly Leu Glu Pro Leu  
 180 185 190  
 Thr Asn Pro Gly Leu Gly Ser Leu Ala Ala His Ala Thr Asp His Gly  
 195 200 205  
 Leu Arg Pro Thr Val Tyr Thr Asn Ser Phe Ala Leu Thr Glu Arg Thr  
 210 215 220  
 Leu Glu Arg Gln Pro Gly Leu Trp Gly Leu His Ala Ile Arg Thr Ser  
 225 230 235 240  
 Leu Tyr Gly Leu Asn Asp Glu Glu Tyr Glu Gln Thr Thr Gly Lys Lys  
 245 250 255  
 Ala Ala Phe Arg Arg Val Arg Glu Asn Leu Arg Arg Phe Gln Gln Leu  
 260 265 270  
 Arg Ala Glu Arg Glu Ser Pro Ile Asn Leu Gly Phe Ala Tyr Ile Val  
 275 280 285  
 Leu Pro Gly Arg Ala Ser Arg Leu Leu Asp Leu Val Asp Phe Ile Ala  
 290 295 300  
 Asp Leu Asn Asp Ala Gly Gln Gly Arg Thr Ile Asp Phe Val Asn Ile  
 305 310 315 320  
 Arg Glu Asp Tyr Ser Gly Arg Asp Asp Gly Lys Leu Pro Gln Glu Glu  
 325 330 335  
 Arg Ala Glu Leu Gln Glu Ala Leu Asn Ala Phe Glu Glu Arg Val Arg  
 340 345 350  
 Glu Arg Thr Pro Gly Leu His Ile Asp Tyr Gly Tyr Ala Leu Asn Ser  
 355 360 365  
 Leu Arg Thr Gly Ala Asp Ala Glu Leu Leu Arg Ile Lys Pro Ala Thr  
 370 375 380  
 Met Arg Pro Thr Ala His Pro Gln Val Ala Val Gln Val Asp Leu Leu  
 385 390 395 400  
 Gly Asp Val Tyr Leu Tyr Arg Glu Ala Gly Phe Pro Asp Leu Asp Gly  
 405 410 415  
 Ala Thr Arg Tyr Ile Ala Gly Arg Val Thr Pro Asp Thr Ser Leu Thr  
 420 425 430  
 Glu Val Val Arg Asp Phe Val Glu Arg Gly Gly Glu Val Ala Ala Val  
 435 440 445  
 Asp Gly Asp Glu Tyr Phe Met Asp Gly Phe Asp Gln Val Val Thr Ala  
 450 455 460  
 Arg Leu Asn Gln Leu Glu Arg Asp Ala Ala Asp Gly Trp Glu Glu Ala  
 465 470 475 480  
 Arg Gly Phe Leu Arg  
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<210> 11

<211> 879

<212> DNA

<213> Streptomyces venezuelae

<400> 11

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ctcatgctcg	gcggtattcg	cgagattcaa	atcatctcga	ccccccagca	catcgaactc	180
ttccagtcgc	ttctcggaaa	cggcaggcac	ctgggaatag	aactcgacta	tgcggtccag	240
aaagagccc	caggaatcgc	ggacgcactt	ctcgtcggag	ccgagcacat	cggcgacgac	300
acctgcgcc	tgatcctggg	cgacaacatc	ttccacgggc	ccggcctcta	cacgtcctg	360
cgggacagca	tcgcgcgcct	cgacggctgc	gtgctcttcg	gctaccgggt	caaggacccc	420

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gagcgggtacg gcgtcgccga ggtggacgcg acggggccggc tgaccgacct cgtcgagaag 480
cccgtcaagc cgcgtctccaa cctcgccgtc accggcctct acctctacga caacgacgtc 540
gtcgacatcg ccaagaacat ccggccctcg ccgcgcggcg agctggagat caccgacgtc 600
aaccgcgtct acctggagcg gggccggggc gaactcgtca acctggggccg cggcttcgcc 660
tggctggaca ccggcaccca cgactcgctc ctgcggggccg cccagtacgt ccaggtcctg 720
gaggagcggc agggcgtctg gatcgcgggc cttgaggaga tcgccttccg catgggcttc 780
atcgacgccg aggcctgtca cggcctggga gaaggcctct cccgcaccga gtacggcagc 840
tatctgatgg agatcgccg ccgcgagggg gccccgtga 879

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<210> 12
<211> 292
<212> PRT
<213> Streptomyces venezuelae

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<400> 12
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Met Ile Tyr Tyr Pro Leu Ser Val Leu Met Leu Gly Gly Ile Arg Glu
35 40 45
Ile Gln Ile Ile Ser Thr Pro Gln His Ile Glu Leu Phe Gln Ser Leu
50 55 60
Leu Gly Asn Gly Arg His Leu Gly Ile Glu Leu Asp Tyr Ala Val Gln
65 70 75 80
Lys Glu Pro Ala Gly Ile Ala Asp Ala Leu Val Gly Ala Glu His
85 90 95
Ile Gly Asp Asp Thr Cys Ala Leu Ile Leu Gly Asp Asn Ile Phe His
100 105 110
Gly Pro Gly Leu Tyr Thr Leu Leu Arg Asp Ser Ile Ala Arg Leu Asp
115 120 125
Gly Cys Val Leu Phe Gly Tyr Pro Val Lys Asp Pro Glu Arg Tyr Gly
130 135 140
Val Ala Glu Val Asp Ala Thr Gly Arg Leu Thr Asp Leu Val Glu Lys
145 150 155 160
Pro Val Lys Pro Arg Ser Asn Leu Ala Val Thr Gly Leu Tyr Leu Tyr
165 170 175
Asp Asn Asp Val Val Asp Ile Ala Lys Asn Ile Arg Pro Ser Pro Arg
180 185 190
Gly Glu Leu Glu Ile Thr Asp Val Asn Arg Val Tyr Leu Glu Arg Gly
195 200 205
Arg Ala Glu Leu Val Asn Leu Gly Arg Gly Phe Ala Trp Leu Asp Thr
210 215 220
Gly Thr His Asp Ser Leu Leu Arg Ala Ala Gln Tyr Val Gln Val Leu
225 230 235 240
Glu Glu Arg Gln Gly Val Trp Ile Ala Gly Leu Glu Glu Ile Ala Phe
245 250 255
Arg Met Gly Phe Ile Asp Ala Glu Ala Cys His Gly Leu Gly Glu Gly
260 265 270
Leu Ser Arg Thr Glu Tyr Gly Ser Tyr Leu Met Glu Ile Ala Gly Arg
275 280 285
Glu Gly Ala Pro
290

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<210> 13
<211> 1014
<212> DNA
<213> Streptomyces venezuelae

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<400> 13
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ctcgccgggg cgtaccccga cgtgcccgcc gatgaggtga tcgtcctgga cagcctcacc 120

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tacgcgggca	accgcgccaa	cctcgccccg	gtggacgcgg	accgcgact	gcgcttcgtc	180
cacggcgaca	tccgcgacgc	cggcctcctc	gcccgggaac	tgcgcggcgt	ggacgccatc	240
gtccacttcg	cggccgagag	ccacgtggac	cgctccatcg	cgggcgcgtc	cgtgttcacc	300
gagaccaacg	tgcagggcac	gcagacgctg	ctccagtgcg	ccgtcgacgc	cggcgctcggc	360
cgggtcgtgc	acgtctccac	cgacgaggtg	tacgggtcga	tcgactccgg	ctcctggacc	420
gagagcagcc	cgctggagcc	caactcgccc	tacgcggcgt	ccaaggccgg	ctccgacctc	480
gttgcccgcg	cctaccaccg	gacgtacggc	ctcgacgtac	ggatcaccgc	ctgctgcaac	540
aactacgggc	cgtaccagca	ccccgagaag	ctcatcccc	tcttcgtgac	gaacctcctc	600
gacggcgggg	cgctcccgtc	gtacggcgac	ggcgcgaacg	tccgcgagtg	ggtgcacacc	660
gacgaccact	gccggggcat	cgcgctcgtc	ctcgcgggcg	gccggggccgg	cgagatctac	720
cacatcggcg	gcggccctga	gctgaccaac	cgcgaactca	ccggcatcct	cctggactcg	780
ctcggcgccg	actggtcctc	ggtccggaag	gtcggccgacc	gcaagggccca	cgacctgcgc	840
tactccctcg	acggcggcga	gatcgagcgc	gagctcggct	accgcccga	ggtctccttc	900
gcggacggcc	tcgcgcggac	cgctccgctg	taccgggaga	accgcggctg	gtgggagccg	960
ctcaaggcga	ccgccccgca	gctgcccgc	accgccgtgg	aggtgtccgc	gtga	1014

<210> 14

<211> 337

<212> PRT

<213> Streptomyces venezuelae

<400> 14

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Val	Arg	Gln	Leu	Leu	Ala	Gly	Ala	Tyr	Pro	Asp	Val	Pro	Ala	Asp	Glu
		20						25					30		
Val	Ile	Val	Leu	Asp	Ser	Leu	Thr	Tyr	Ala	Gly	Asn	Arg	Ala	Asn	Leu
		35					40					45			
Ala	Pro	Val	Asp	Ala	Asp	Pro	Arg	Leu	Arg	Phe	Val	His	Gly	Asp	Ile
	50					55				60					
Arg	Asp	Ala	Gly	Leu	Leu	Ala	Arg	Glu	Leu	Arg	Gly	Val	Asp	Ala	Ile
65					70					75				80	
Val	His	Phe	Ala	Ala	Glu	Ser	His	Val	Asp	Arg	Ser	Ile	Ala	Gly	Ala
			85					90					95		
Ser	Val	Phe	Thr	Glu	Thr	Asn	Val	Gln	Gly	Thr	Gln	Thr	Leu	Leu	Gln
			100					105					110		
Cys	Ala	Val	Asp	Ala	Gly	Val	Gly	Arg	Val	Val	His	Val	Ser	Thr	Asp
		115					120					125			
Glu	Val	Tyr	Gly	Ser	Ile	Asp	Ser	Gly	Ser	Trp	Thr	Glu	Ser	Ser	Pro
	130					135					140				
Leu	Glu	Pro	Asn	Ser	Pro	Tyr	Ala	Ala	Ser	Lys	Ala	Gly	Ser	Asp	Leu
145					150					155					160
Val	Ala	Arg	Ala	Tyr	His	Arg	Thr	Tyr	Gly	Leu	Asp	Val	Arg	Ile	Thr
			165					170						175	
Arg	Cys	Cys	Asn	Asn	Tyr	Gly	Pro	Tyr	Gln	His	Pro	Glu	Lys	Leu	Ile
			180					185					190		
Pro	Leu	Phe	Val	Thr	Asn	Leu	Leu	Asp	Gly	Gly	Thr	Leu	Pro	Leu	Tyr
		195					200					205			
Gly	Asp	Gly	Ala	Asn	Val	Arg	Glu	Trp	Val	His	Thr	Asp	Asp	His	Cys
	210					215					220				
Arg	Gly	Ile	Ala	Leu	Val	Leu	Ala	Gly	Gly	Arg	Ala	Gly	Glu	Ile	Tyr
225					230					235					240
His	Ile	Gly	Gly	Gly	Leu	Glu	Leu	Thr	Asn	Arg	Glu	Leu	Thr	Gly	Ile
			245					250						255	
Leu	Leu	Asp	Ser	Leu	Gly	Ala	Asp	Trp	Ser	Ser	Val	Arg	Lys	Val	Ala
		260					265						270		
Asp	Arg	Lys	Gly	His	Asp	Leu	Arg	Tyr	Ser	Leu	Asp	Gly	Gly	Glu	Ile
		275					280					285			
Glu	Arg	Glu	Leu	Gly	Tyr	Arg	Pro	Gln	Val	Ser	Phe	Ala	Asp	Gly	Leu
	290					295					300				
Ala	Arg	Thr	Val	Arg	Trp	Tyr	Arg	Glu	Asn	Arg	Gly	Trp	Trp	Glu	Pro
305					310					315					320

Leu Lys Ala Thr Ala Pro Gln Leu Pro Ala Thr Ala Val Glu Val Ser  
 325 330 335  
 Ala

<210> 15  
 <211> 1140  
 <212> DNA  
 <213> Streptomyces venezuelae

<400> 15  
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 ctccgaccgg aactcgaagg attcgaggcg gagttcgccg cgtactgcga gacggaccac 180  
 gccgtcggcg tgaacagcgg gatggacgcc ctccagctcg ccctccgcgg cctcggcatc 240  
 ggacccgggg acgaggtgat cgtcccctcg cacacgtaca tcgccagctg gctcgcggtg 300  
 tccgccaccg gcgcgacccc cgtgcccgctc gagccgcacg aggaccaccc caccctggac 360  
 ccgctgctcg tcgagaaggc gatcaccccc cgcacccggg cgctcctccc cgtccacctc 420  
 tacgggcacc ccgccgacat ggacgccttc cgcgagctcg cggaccggca cggcctgcac 480  
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 ggccggcgcc tcgtcacccg cgaccccgag ctgcgccgaac ggctccggat gctccgcaac 660  
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 atgcaggccg ccgtgctgcg gatccggctc gccacctgg acagctggaa cggccgcagg 780  
 tcggcgctgg ccgcggagta cctctccggg ctgcgccgac tgcccggcat cggcctgccg 840  
 gtgaccgcgc ccgacaccga cccggtcttg cacctcttca ccgtgcgcac cgagcgccgc 900  
 gacgagctgc gcagccacct cgacgcccgc ggcatcgaca cctcacgca ctaccggta 960  
 cccgtgcacc tctcgcccgc ctacgcgggc gaggcaccgc cgggaaggctc gctcccgcgg 1020  
 gccgagagct tcgcgcggca ggtcctcagc ctgccgatcg gcccgacct ggagcgcccg 1080  
 caggcgctgc ggggtgatcga cgccgtgcgc gaatggggccg agcgggtcga ccaggcctag 1140

<210> 16  
 <211> 379  
 <212> PRT  
 <213> Streptomyces venezuelae

<400> 16  
 Met Ser Ser Arg Ala Glu Thr Pro Arg Val Pro Phe Leu Asp Leu Lys  
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 Ala Ala Tyr Glu Glu Leu Arg Ala Glu Thr Asp Ala Ala Ile Ala Arg  
 20 25 30  
 Val Leu Asp Ser Gly Arg Tyr Leu Leu Gly Pro Glu Leu Gly Phe  
 35 40 45  
 Glu Ala Glu Phe Ala Ala Tyr Cys Glu Thr Asp His Ala Val Gly Val  
 50 55 60  
 Asn Ser Gly Met Asp Ala Leu Gln Leu Ala Leu Arg Gly Leu Gly Ile  
 65 70 75 80  
 Gly Pro Gly Asp Glu Val Ile Val Pro Ser His Thr Tyr Ile Ala Ser  
 85 90 95  
 Trp Leu Ala Val Ser Ala Thr Gly Ala Thr Pro Val Pro Val Glu Pro  
 100 105 110  
 His Glu Asp His Pro Thr Leu Asp Pro Leu Leu Val Glu Lys Ala Ile  
 115 120 125  
 Thr Pro Arg Thr Arg Ala Leu Leu Pro Val His Leu Tyr Gly His Pro  
 130 135 140  
 Ala Asp Met Asp Ala Leu Arg Glu Leu Ala Asp Arg His Gly Leu His  
 145 150 155 160  
 Ile Val Glu Asp Ala Ala Gln Ala His Gly Ala Arg Tyr Arg Gly Arg  
 165 170 175  
 Arg Ile Gly Ala Gly Ser Ser Val Ala Ala Phe Ser Phe Tyr Pro Gly  
 180 185 190

Lys Asn Leu Gly Cys Phe Gly Asp Gly Gly Ala Val Val Thr Gly Asp  
 195 200 205  
 Pro Glu Leu Ala Glu Arg Leu Arg Met Leu Arg Asn Tyr Gly Ser Arg  
 210 215 220  
 Gln Lys Tyr Ser His Glu Thr Lys Gly Thr Asn Ser Arg Leu Asp Glu  
 225 230 235 240  
 Met Gln Ala Ala Val Leu Arg Ile Arg Leu Ala His Leu Asp Ser Trp  
 245 250 255  
 Asn Gly Arg Arg Ser Ala Leu Ala Ala Glu Tyr Leu Ser Gly Leu Ala  
 260 265 270  
 Gly Leu Pro Gly Ile Gly Leu Pro Val Thr Ala Pro Asp Thr Asp Pro  
 275 280 285  
 Val Trp His Leu Phe Thr Val Arg Thr Glu Arg Arg Asp Glu Leu Arg  
 290 295 300  
 Ser His Leu Asp Ala Arg Gly Ile Asp Thr Leu Thr His Tyr Pro Val  
 305 310 315 320  
 Pro Val His Leu Ser Pro Ala Tyr Ala Gly Glu Ala Pro Pro Glu Gly  
 325 330 335  
 Ser Leu Pro Arg Ala Glu Ser Phe Ala Arg Gln Val Leu Ser Leu Pro  
 340 345 350  
 Ile Gly Pro His Leu Glu Arg Pro Gln Ala Leu Arg Val Ile Asp Ala  
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 Val Arg Glu Trp Ala Glu Arg Val Asp Gln Ala  
 370 375

<210> 17  
 <211> 714  
 <212> DNA  
 <213> Streptomyces venezuelae

<400> 17  
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 tcgctcctgg acgtggcctg cggtaggggc acgcatctgg agcacttcac caaggagttc 180  
 ggcgacaccg ccggcctgga gctgtccgag gacatgctca cccacgcccg caagcggctg 240  
 cccgacgcca cgctccacca gggcgacatg cgggacttcc ggctcggccg gaagttctcc 300  
 gccgtgggtca gcatgttcag ctccgtcggc tacctgaaga cgaccgagga actcggcgcg 360  
 gccgtcgccct cgctcgcgga gcacctggag cccggtggcg tcgtcgtcgt cgagccgtgg 420  
 tggttcccgg agaccttcgc cgacggctgg gtcagcgccg acgtcgtccg ccgtgacggg 480  
 cgcaccgtgg cccgtgtctc gactcgggtg cgggagggga acgcgacgcg catggaggtc 540  
 cacttcaccg tggccgaccc gggcaagggc gtgcggcact tctccgacgt ccatctcatc 600  
 accctgttcc accaggccga gtacgaggcc gcgttcacgg ccgccgggct gcgcgtcgag 660  
 tacctggagg gcggcccgtc gggccgtggc ctcttcgctc gcgtccccgc ctga 714

<210> 18  
 <211> 237  
 <212> PRT  
 <213> Streptomyces venezuelae

<400> 18  
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 Arg Gly Lys Asp Tyr Ala Ala Glu Ala Ser Asp Ile Ala Asp Leu Val  
 20 25 30  
 Arg Ser Arg Thr Pro Glu Ala Ser Ser Leu Leu Asp Val Ala Cys Gly  
 35 40 45  
 Thr Gly Thr His Leu Glu His Phe Thr Lys Glu Phe Gly Asp Thr Ala  
 50 55 60  
 Gly Leu Glu Leu Ser Glu Asp Met Leu Thr His Ala Arg Lys Arg Leu  
 65 70 75 80  
 Pro Asp Ala Thr Leu His Gln Gly Asp Met Arg Asp Phe Arg Leu Gly  
 85 90 95

Arg	Lys	Phe	Ser	Ala	Val	Val	Ser	Met	Phe	Ser	Ser	Val	Gly	Tyr	Leu
			100					105					110		
Lys	Thr	Thr	Glu	Glu	Leu	Gly	Ala	Ala	Val	Ala	Ser	Phe	Ala	Glu	His
		115					120					125			
Leu	Glu	Pro	Gly	Gly	Val	Val	Val	Val	Glu	Pro	Trp	Trp	Phe	Pro	Glu
	130					135					140				
Thr	Phe	Ala	Asp	Gly	Trp	Val	Ser	Ala	Asp	Val	Val	Arg	Arg	Asp	Gly
145				150					155					160	
Arg	Thr	Val	Ala	Arg	Val	Ser	His	Ser	Val	Arg	Glu	Gly	Asn	Ala	Thr
			165					170					175		
Arg	Met	Glu	Val	His	Phe	Thr	Val	Ala	Asp	Pro	Gly	Lys	Gly	Val	Arg
			180					185				190			
His	Phe	Ser	Asp	Val	His	Leu	Ile	Thr	Leu	Phe	His	Gln	Ala	Glu	Tyr
		195				200					205				
Glu	Ala	Ala	Phe	Thr	Ala	Ala	Gly	Leu	Arg	Val	Glu	Tyr	Leu	Glu	Gly
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225					230					235					

<210> 19  
 <211> 1281  
 <212> DNA  
 <213> Streptomyces venezuelae

<400> 19										
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gacacccatca	ccgggtcccg	gctcgcccg	gtgccgggtcg	gcaccgacca	cctcatccac					180
gagtaccggg	tgcggatggc	gggcgagccg	cgcccgaacc	atccggcgat	cgccttcgac					240
gaggcccgctc	ccgagccgct	ggactgggac	cacgcctctg	gcacgcaggc	gacccctgcc					300
ccgtacttcc	atctgctcgc	caacaacgac	tcgatggctg	acgacctcgt	cgacttcgcc					360
cggtcctggc	agccggacct	ggtgctgtgg	gagccgacga	cctacgcggg	cgccgtcgcc					420
gcccaggtca	ccggtgccgc	gcacgcccgg	gtcctgtggg	ggcccagcgt	gatgggcagc					480
gcccgcgcga	agttcgtcgc	gctgcgggac	cggcagccgc	ccgagcaccg	cgaggacccc					540
accgcggagt	ggctgacgtg	gacgctcgac	cggtacggcg	cctccttcga	agaggagctg					600
ctcaccggcc	agttcacgat	cgacccgacc	ccgccgagcc	tgccgctcga	cacgggcctg					660
ccgaccgtcg	ggatgcgtta	tgttccttac	aacggcacgt	cggtcgtgcc	ggactggctg					720
agtgagccgc	ccgcgcggcc	ccgggtctgc	ctgacctctg	gcgtctccgc	gcgtgaggtc					780
ctcggcgggc	acggcgcttc	gcagggcgac	atcctggagg	cgctcgccga	cctcgacatc					840
gagctcgtcg	ccacgctcga	cgcgagtcag	cgcgccgaga	tccgcaacta	cccgaagcac					900
acccgggttca	cggacttcgt	gccgatgcac	gcgctcctgc	cgagctgctc	ggcgatcatc					960
caccacggcg	gggcggggcac	ctacgcgacc	gccgtgatca	acgcgggtgcc	gcaggtcatg					1020
ctcgccgagc	tgtgggacgc	gccgggtcaag	gcgcggggccg	tcgccgagca	gggggcgggg					1080
ttcttctctgc	cgccggccga	gctcacgctg	caggccgtgc	gggacgccgt	cgtccgcac					1140
ctcgacgacc	cctcggtcgc	caccgcccgc	caccgggtgc	gcgaggagac	cttcggcgac					1200
cccaccccg	ccgggatcgt	ccccgagctg	gagcggctcg	ccgcgcagca	ccgccgccc					1260
ccggccgacg	ccggcactg	a								1281

<210> 20  
 <211> 426  
 <212> PRT  
 <213> Streptomyces venezuelae

<400> 20															
Met	Arg	Val	Leu	Leu	Thr	Ser	Phe	Ala	His	His	Thr	His	Tyr	Tyr	Gly
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Leu	Val	Pro	Leu	Ala	Trp	Ala	Leu	Leu	Ala	Ala	Gly	His	Glu	Val	Arg
		20					25				30				
Val	Ala	Ser	Gln	Pro	Ala	Leu	Thr	Asp	Thr	Ile	Thr	Gly	Ser	Gly	Leu
	35					40				45					
Ala	Ala	Val	Pro	Val	Gly	Thr	Asp	His	Leu	Ile	His	Glu	Tyr	Arg	Val
50					55					60					

Arg Met Ala Gly Glu Pro Arg Pro Asn His Pro Ala Ile Ala Phe Asp  
 65 70 75 80  
 Glu Ala Arg Pro Glu Pro Leu Asp Trp Asp His Ala Leu Gly Ile Glu  
 85 90 95  
 Ala Ile Leu Ala Pro Tyr Phe His Leu Leu Ala Asn Asn Asp Ser Met  
 100 105 110  
 Val Asp Asp Leu Val Asp Phe Ala Arg Ser Trp Gln Pro Asp Leu Val  
 115 120 125  
 Leu Trp Glu Pro Thr Thr Tyr Ala Gly Ala Val Ala Ala Gln Val Thr  
 130 135 140  
 Gly Ala Ala His Ala Arg Val Leu Trp Gly Pro Asp Val Met Gly Ser  
 145 150 155 160  
 Ala Arg Arg Lys Phe Val Ala Leu Arg Asp Arg Gln Pro Pro Glu His  
 165 170 175  
 Arg Glu Asp Pro Thr Ala Glu Trp Leu Thr Trp Thr Leu Asp Arg Tyr  
 180 185 190  
 Gly Ala Ser Phe Glu Glu Glu Leu Leu Thr Gly Gln Phe Thr Ile Asp  
 195 200 205  
 Pro Thr Pro Pro Ser Leu Arg Leu Asp Thr Gly Leu Pro Thr Val Gly  
 210 215 220  
 Met Arg Tyr Val Pro Tyr Asn Gly Thr Ser Val Val Pro Asp Trp Leu  
 225 230 235 240  
 Ser Glu Pro Pro Ala Arg Pro Arg Val Cys Leu Thr Leu Gly Val Ser  
 245 250 255  
 Ala Arg Glu Val Leu Gly Gly Asp Gly Val Ser Gln Gly Asp Ile Leu  
 260 265 270  
 Glu Ala Leu Ala Asp Leu Asp Ile Glu Leu Val Ala Thr Leu Asp Ala  
 275 280 285  
 Ser Gln Arg Ala Glu Ile Arg Asn Tyr Pro Lys His Thr Arg Phe Thr  
 290 295 300  
 Asp Phe Val Pro Met His Ala Leu Leu Pro Ser Cys Ser Ala Ile Ile  
 305 310 315 320  
 His His Gly Gly Ala Gly Thr Tyr Ala Thr Ala Val Ile Asn Ala Val  
 325 330 335  
 Pro Gln Val Met Leu Ala Glu Leu Trp Asp Ala Pro Val Lys Ala Arg  
 340 345 350  
 Ala Val Ala Glu Gln Gly Ala Gly Phe Phe Leu Pro Pro Ala Glu Leu  
 355 360 365  
 Thr Pro Gln Ala Val Arg Asp Ala Val Val Arg Ile Leu Asp Asp Pro  
 370 375 380  
 Ser Val Ala Thr Ala Ala His Arg Leu Arg Glu Thr Phe Gly Asp  
 385 390 395 400  
 Pro Thr Pro Ala Gly Ile Val Pro Glu Leu Glu Arg Leu Ala Ala Gln  
 405 410 415  
 His Arg Arg Pro Pro Ala Asp Ala Arg His  
 420 425

<210> 21

<211> 1209

<212> DNA

<213> *Streptomyces venezuelae*

<400> 21

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gccgcgaacg	gcgaccgta	cgccaccgtg	ctgcgcggcc	aggcggacga	cccgtatccc	180
gcgtacgagc	gggtgcgtgc	ccgcggcgcg	ctctccttca	gcccgcgagg	cagctgggtc	240
accgccgatc	acgccctggc	ggcgagcatc	ctctgctcga	cggacttcgg	ggctctccggc	300
gccgacggcg	tcccgggtgcc	gcagcaggtc	ctctcgtacg	gggagggctg	tccgctggag	360
cgcgacgagg	tgctgcgggc	ggccgggtgac	gtgccggagg	gcgggcagcg	tgccgtggtc	420
gaggggatcc	accgggagac	gctggagggt	ctcgcgccgg	accgctcggc	gtcgtacgcc	480
ttcgagctgc	tgggcgggtt	cgtccgcgccg	gcgggtgacgg	ccgctgcgcg	cgccgtgctg	540

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ggtgttccccg cggaccggcg cgcggacttc gcggtatctgc tggagcgggt cgggccgctg 600
tccgacagcc tgctggcccc gcagtccctg cggacgggtac gggcgggcgga cggcgcgctg 660
gccgagctca cggcgctgct cgccgattcg gacgactccc ccggggccct gctgtcggcg 720
ctcgggggtca ccgcagccgt ccagctcacc gggaacgcgg tgcgcgcgt cctcgcgcgt 780
cccgagcagt ggcgggagct gtgcgaccgg cccgggctcg cggcgggcgc ggtggaggag 840
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ctggcggggc ggcggtgcc ggccggggcg catgtcgtcg tcctgaccgc cgcgaccggc 960
cgggaccggg aggtcttcac ggaccgggag cgcttcgacc tcgcgcgcgc cgacgccgcc 1020
gcgcacctcg cgctgcaccc cgccgggtccg tacggcccgg tggcgctcct ggtccggctt 1080
caggcggagg tcgcgtgctg gacctggcc gggcgtttcc ccgggctgcg gcaggcgggg 1140
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agctcctga 1209

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<210> 22
<211> 402
<212> PRT
<213> Streptomyces venezuelae

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<400> 22
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Thr Val Arg Ala Val Ala Asp Arg Glu Leu Gly Thr His Leu Leu Glu
20 25 30
Thr Arg Gly Ile His Trp Ile His Ala Ala Asn Gly Asp Pro Tyr Ala
35 40 45
Thr Val Leu Arg Gly Gln Ala Asp Asp Pro Tyr Pro Ala Tyr Glu Arg
50 55 60
Val Arg Ala Arg Gly Ala Leu Ser Phe Ser Pro Thr Gly Ser Trp Val
65 70 75 80
Thr Ala Asp His Ala Leu Ala Ala Ser Ile Leu Cys Ser Thr Asp Phe
85 90 95
Gly Val Ser Gly Ala Asp Gly Val Pro Val Pro Gln Gln Val Leu Ser
100 105 110
Tyr Gly Glu Gly Cys Pro Leu Glu Arg Glu Gln Val Leu Pro Ala Ala
115 120 125
Gly Asp Val Pro Glu Gly Gly Gln Arg Ala Val Val Glu Gly Ile His
130 135 140
Arg Glu Thr Leu Glu Gly Leu Ala Pro Asp Pro Ser Ala Ser Tyr Ala
145 150 155 160
Phe Glu Leu Leu Gly Gly Phe Val Arg Pro Ala Val Thr Ala Ala Ala
165 170 175
Ala Ala Val Leu Gly Val Pro Ala Asp Arg Arg Ala Asp Phe Ala Asp
180 185 190
Leu Leu Glu Arg Leu Arg Pro Leu Ser Asp Ser Leu Leu Ala Pro Gln
195 200 205
Ser Leu Arg Thr Val Arg Ala Ala Asp Gly Ala Leu Ala Glu Leu Thr
210 215 220
Ala Leu Leu Ala Asp Ser Asp Asp Ser Pro Gly Ala Leu Leu Ser Ala
225 230 235 240
Leu Gly Val Thr Ala Ala Val Gln Leu Thr Gly Asn Ala Val Leu Ala
245 250 255
Leu Leu Ala His Pro Glu Gln Trp Arg Glu Leu Cys Asp Arg Pro Gly
260 265 270
Leu Ala Ala Ala Ala Val Glu Glu Thr Leu Arg Tyr Asp Pro Pro Val
275 280 285
Gln Leu Asp Ala Arg Val Val Arg Gly Glu Thr Glu Leu Ala Gly Arg
290 295 300
Arg Leu Pro Ala Gly Ala His Val Val Val Leu Thr Ala Ala Thr Gly
305 310 315 320
Arg Asp Pro Glu Val Phe Thr Asp Pro Glu Arg Phe Asp Leu Ala Arg
325 330 335

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Pro Asp Ala Ala Ala His Leu Ala Leu His Pro Ala Gly Pro Tyr Gly  
340 345 350  
Pro Val Ala Ser Leu Val Arg Leu Gln Ala Glu Val Ala Leu Arg Thr  
355 360 365  
Leu Ala Gly Arg Phe Pro Gly Leu Arg Gln Ala Gly Asp Val Leu Arg  
370 375 380  
Pro Arg Arg Ala Pro Val Gly Arg Gly Pro Leu Ser Val Pro Val Ser  
385 390 395 400  
Ser Ser

<210> 23  
<211> 2430  
<212> DNA  
<213> Streptomyces venezuelae

<400> 23  
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gccgccgaca cgccaatgt tcagtacacg agccgggcgg cggagctcgt cgcccagatg 180  
acgctcgacg agaagatcag cttcgtccac tgggcgctgg acccgaccg gcagaacgtc 240  
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aacggcatcc gcctggtggg gcagaccgcc accgcgtgc ccgcgcgggt cgccctggcc 360  
agcaccttcg acgacaccat ggccgacagc tacggcaagg tcatgggccc cgacggtcgc 420  
gcgtcaacc aggacatggt cctgggcccg atgatgaaca acatccgggt gccgcacggc 480  
ggccggaact acgagacctt cagcgaggac cccctggtct cctcgcgcac cgcggtcgcc 540  
cagatcaagg gcatccaggg tgcgggtctg atgaccacgg ccaagcactt cgcgcccaac 600  
aaccaggaga acaaccgctt ctccgtgaac gccaatgtcg acgagcagac gctccgcgag 660  
atcgagttcc cggcgttcga gggtcctcc aaggccggcg cggcctcctt catgtgtgcc 720  
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gacgccatca ccaagggcct cgaccaggag atgggcgtcg agtccccgg cgacgtcccg 900  
aaggcgagc cctcgccgcc ggccaagttc ttcggcgagg cgtgaagac ggccgtcctg 960  
aacggcacgg tccccgaggc ggccgtgacg cggtcggcgg agcggatcgt cggccagatg 1020  
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tcggcgcgga aggcccgta ggcggtcgtc ttgcctacg acgacggcac cgagggcgtc 1740  
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ggggcgagcg ccacggtcaa cgtctggtga 2430

<210> 24  
 <211> 809  
 <212> PRT  
 <213> Streptomyces venezuelae

<400> 24  
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 Pro Arg Ala Phe Thr Leu Ala Val Val Gly Thr Leu Leu Ala Gly Thr  
 20 25 30  
 Thr Val Ala Ala Ala Pro Gly Ala Ala Asp Thr Ala Asn Val Gln  
 35 40 45  
 Tyr Thr Ser Arg Ala Ala Glu Leu Val Ala Gln Met Thr Leu Asp Glu  
 50 55 60  
 Lys Ile Ser Phe Val His Trp Ala Leu Asp Pro Asp Arg Gln Asn Val  
 65 70 75 80  
 Gly Tyr Leu Pro Gly Val Pro Arg Leu Gly Ile Pro Glu Leu Arg Ala  
 85 90 95  
 Ala Asp Gly Pro Asn Gly Ile Arg Leu Val Gly Gln Thr Ala Thr Ala  
 100 105 110  
 Leu Pro Ala Pro Val Ala Leu Ala Ser Thr Phe Asp Asp Thr Met Ala  
 115 120 125  
 Asp Ser Tyr Gly Lys Val Met Gly Arg Asp Gly Arg Ala Leu Asn Gln  
 130 135 140  
 Asp Met Val Leu Gly Pro Met Met Asn Asn Ile Arg Val Pro His Gly  
 145 150 155 160  
 Gly Arg Asn Tyr Glu Thr Phe Ser Glu Asp Pro Leu Val Ser Ser Arg  
 165 170 175  
 Thr Ala Val Ala Gln Ile Lys Gly Ile Gln Gly Ala Gly Leu Met Thr  
 180 185 190  
 Thr Ala Lys His Phe Ala Ala Asn Asn Gln Glu Asn Asn Arg Phe Ser  
 195 200 205  
 Val Asn Ala Asn Val Asp Glu Gln Thr Leu Arg Glu Ile Glu Phe Pro  
 210 215 220  
 Ala Phe Glu Ala Ser Ser Lys Ala Gly Ala Ala Ser Phe Met Cys Ala  
 225 230 235 240  
 Tyr Asn Gly Leu Asn Gly Lys Pro Ser Cys Gly Asn Asp Glu Leu Leu  
 245 250 255  
 Asn Asn Val Leu Arg Thr Gln Trp Gly Phe Gln Gly Trp Val Met Ser  
 260 265 270  
 Asp Trp Leu Ala Thr Pro Gly Thr Asp Ala Ile Thr Lys Gly Leu Asp  
 275 280 285  
 Gln Glu Met Gly Val Glu Leu Pro Gly Asp Val Pro Lys Gly Glu Pro  
 290 295 300  
 Ser Pro Pro Ala Lys Phe Phe Gly Glu Ala Leu Lys Thr Ala Val Leu  
 305 310 315 320  
 Asn Gly Thr Val Pro Glu Ala Ala Val Thr Arg Ser Ala Glu Arg Ile  
 325 330 335  
 Val Gly Gln Met Glu Lys Phe Gly Leu Leu Leu Ala Thr Pro Ala Pro  
 340 345 350  
 Arg Pro Glu Arg Asp Lys Ala Gly Ala Gln Ala Val Ser Arg Lys Val  
 355 360 365  
 Ala Glu Asn Gly Ala Val Leu Leu Arg Asn Glu Gly Gln Ala Leu Pro  
 370 375 380  
 Leu Ala Gly Asp Ala Gly Lys Ser Ile Ala Val Ile Gly Pro Thr Ala  
 385 390 395 400  
 Val Asp Pro Lys Val Thr Gly Leu Gly Ser Ala His Val Val Pro Asp  
 405 410 415  
 Ser Ala Ala Ala Pro Leu Asp Thr Ile Lys Ala Arg Ala Gly Ala Gly  
 420 425 430  
 Ala Thr Val Thr Tyr Glu Thr Gly Glu Glu Thr Phe Gly Thr Gln Ile  
 435 440 445

Pro Ala Gly Asn Leu Ser Pro Ala Phe Asn Gln Gly His Gln Leu Glu  
 450 455 460  
 Pro Gly Lys Ala Gly Ala Leu Tyr Asp Gly Thr Leu Thr Val Pro Ala  
 465 470 475 480  
 Asp Gly Glu Tyr Arg Ile Ala Val Arg Ala Thr Gly Gly Tyr Ala Thr  
 485 490 495  
 Val Gln Leu Gly Ser His Thr Ile Glu Ala Gly Gln Val Tyr Gly Lys  
 500 505 510  
 Val Ser Ser Pro Leu Leu Lys Leu Thr Lys Gly Thr His Lys Leu Thr  
 515 520 525  
 Ile Ser Gly Phe Ala Met Ser Ala Thr Pro Leu Ser Leu Glu Leu Gly  
 530 535 540  
 Trp Val Thr Pro Ala Ala Ala Asp Ala Thr Ile Ala Lys Ala Val Glu  
 545 550 555 560  
 Ser Ala Arg Lys Ala Arg Thr Ala Val Val Phe Ala Tyr Asp Asp Gly  
 565 570 575  
 Thr Glu Gly Val Asp Arg Pro Asn Leu Ser Leu Pro Gly Thr Gln Asp  
 580 585 590  
 Lys Leu Ile Ser Ala Val Ala Asp Ala Asn Pro Asn Thr Ile Val Val  
 595 600 605  
 Leu Asn Thr Gly Ser Ser Val Leu Met Pro Trp Leu Ser Lys Thr Arg  
 610 615 620  
 Ala Val Leu Asp Met Trp Tyr Pro Gly Gln Ala Gly Ala Glu Ala Thr  
 625 630 635 640  
 Ala Ala Leu Leu Tyr Gly Asp Val Asn Pro Ser Gly Lys Leu Thr Gln  
 645 650 655  
 Ser Phe Pro Ala Ala Glu Asn Gln His Ala Val Ala Gly Asp Pro Thr  
 660 665 670  
 Ser Tyr Pro Gly Val Asp Asn Gln Gln Thr Tyr Arg Glu Gly Ile His  
 675 680 685  
 Val Gly Tyr Arg Trp Phe Asp Lys Glu Asn Val Lys Pro Leu Phe Pro  
 690 695 700  
 Phe Gly His Gly Leu Ser Tyr Thr Ser Phe Thr Gln Ser Ala Pro Thr  
 705 710 715 720  
 Val Val Arg Thr Ser Thr Gly Gly Leu Lys Val Thr Val Thr Val Arg  
 725 730 735  
 Asn Ser Gly Lys Arg Ala Gly Gln Glu Val Val Gln Ala Tyr Leu Gly  
 740 745 750  
 Ala Ser Pro Asn Val Thr Ala Pro Gln Ala Lys Lys Lys Leu Val Gly  
 755 760 765  
 Tyr Thr Lys Val Ser Leu Ala Ala Gly Glu Ala Lys Thr Val Thr Val  
 770 775 780  
 Asn Val Asp Arg Arg Gln Leu Gln Thr Gly Ser Ser Ser Ala Asp Leu  
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 Arg Gly Ser Ala Thr Val Asn Val Trp  
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<210> 25

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> A consensus sequence.

<221> VARIANT

<222> (4)...(4)

<223> Residue 4 is either V or I.

<400> 25

Leu Leu Asp Val Ala Cys Gly Thr Gly  
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<210> 26  
 <211> 1011  
 <212> DNA  
 <213> Streptomyces venezuelae

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 gacggtagga acgttctcga aatcggcccc ggaaagggcg cgataaccga ggagttgggtg 180  
 cgctccttcg acaccgtgac ggtcgtggag atggaccgcg actggggccgc gcatgtgcgg 240  
 cggaaattcg aaggggagag ggtcaccgta ttccaggggtg atttcctcga cttccgcatt 300  
 ccgcgcgata tcgacaccgt cgtcggaaac gttcccttcg gcatcacgac ccagattctc 360  
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<210> 27  
 <211> 336  
 <212> PRT  
 <213> Streptomyces venezuelae

<400> 27  
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 35 40 45  
 Gly Pro Gly Lys Gly Ala Ile Thr Glu Glu Leu Val Arg Ser Phe Asp  
 50 55 60  
 Thr Val Thr Val Val Glu Met Asp Pro His Trp Ala Ala His Val Arg  
 65 70 75 80  
 Arg Lys Phe Glu Gly Glu Arg Val Thr Val Phe Gln Gly Asp Phe Leu  
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 Asp Phe Arg Ile Pro Arg Asp Ile Asp Thr Val Val Gly Asn Val Pro  
 100 105 110  
 Phe Gly Ile Thr Thr Gln Ile Leu Arg Ser Leu Leu Glu Ser Thr Asn  
 115 120 125  
 Trp Gln Ser Ala Ala Leu Ile Val Gln Trp Glu Val Ala Arg Lys Arg  
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 Ala Gly Arg Ser Gly Gly Ser Leu Leu Thr Thr Ser Trp Ala Pro Trp  
 145 150 155 160  
 Tyr Glu Phe Ala Val His Asp Arg Val Arg Ala Ser Ser Phe Arg Pro  
 165 170 175  
 Met Pro Arg Val Asp Gly Gly Val Leu Thr Ile Arg Arg Arg Pro Gln  
 180 185 190  
 Pro Leu Leu Pro Glu Ser Ala Ser Arg Ala Phe Gln Asn Phe Ala Glu  
 195 200 205  
 Ala Val Phe Thr Gly Pro Gly Arg Gly Leu Ala Glu Ile Leu Arg Arg  
 210 215 220  
 His Ile Pro Lys Arg Thr Tyr Arg Ser Leu Ala Asp Arg His Gly Ile  
 225 230 235 240  
 Pro Asp Gly Gly Leu Pro Lys Asp Leu Thr Leu Thr Gln Trp Ile Ala  
 245 250 255

Leu Phe Gln Ala Ser Gln Pro Ser Tyr Ala Pro Gly Ala Pro Gly Thr  
 260 265 270  
 Arg Met Pro Gly Gln Gly Gly Gly Ala Gly Gly Arg Asp Tyr Asp Ser  
 275 280 285  
 Glu Thr Ser Arg Ala Ala Val Pro Gly Ser Arg Arg Tyr Gly Pro Thr  
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 <211> 969  
 <212> DNA  
 <213> *Streptomyces venezuelae*

<400> 28  
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<210> 29  
 <211> 322  
 <212> PRT  
 <213> *Streptomyces venezuelae*

<400> 29  
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 Val Val His His Asp Phe Leu Gln Tyr Pro Leu Pro Arg Asn Pro His  
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 Val Val Val Gly Asn Val Pro Phe His Leu Thr Thr Ala Ile Met Arg  
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 Arg Leu Leu Asp Ala Gln His Trp His Thr Ala Val Leu Leu Val Gln  
 115 120 125  
 Trp Glu Val Ala Arg Arg Arg Ala Gly Val Gly Gly Ser Thr Leu Leu  
 130 135 140  
 Thr Ala Gly Trp Ala Pro Trp Tyr Glu Phe Asp Leu His Ser Arg Val  
 145 150 155 160

Pro Ala Arg Ala Phe Arg Pro Met Pro Gly Val Asp Gly Gly Val Leu  
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 Ala Ile Arg Arg Arg Ser Ala Pro Leu Val Gly Gln Val Lys Thr Tyr  
 180 185 190  
 Gln Asp Phe Val Arg Gln Val Phe Thr Gly Lys Gly Asn Gly Leu Lys  
 195 200 205  
 Glu Ile Leu Arg Arg Thr Gly Arg Ile Ser Gln Arg Asp Leu Ala Thr  
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 Trp Leu Arg Arg Asn Glu Ile Ser Pro His Ala Leu Pro Lys Asp Leu  
 225 230 235 240  
 Lys Pro Gly Gln Trp Ala Ser Leu Trp Glu Leu Thr Gly Gly Thr Ala  
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 Asp Gly Ser Phe Asp Gly Thr Ala Gly Gly Gly Ala Ala Gly Ser His  
 260 265 270  
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<210> 30  
 <211> 13842  
 <212> DNA  
 <213> *Streptomyces venezuelae*

<400> 30  
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          20          25          30
Gly Leu Pro Pro Ala Gly Pro Asp His Ala Glu His Ser Phe Ser Arg
 35          40          45
Ala Pro Thr Gly Asp Val Arg Ala Glu Leu Ile Arg Gly Glu Met Ser
 50          55          60
Thr Val Ser Lys Ser Glu Ser Glu Glu Phe Val Ser Val Ser Asn Asp
 65          70          75          80
Ala Gly Ser Ala His Gly Thr Ala Glu Pro Val Ala Val Val Gly Ile
          85          90          95
Ser Cys Arg Val Pro Gly Ala Arg Asp Pro Arg Glu Phe Trp Glu Leu
 100          105          110
Leu Ala Ala Gly Gly Gln Ala Val Thr Asp Val Pro Ala Asp Arg Trp
 115          120          125
Asn Ala Gly Asp Phe Tyr Asp Pro Asp Arg Ser Ala Pro Gly Arg Ser
 130          135          140
Asn Ser Arg Trp Gly Gly Phe Ile Glu Asp Val Asp Arg Phe Asp Ala
 145          150          155          160
Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Ala Glu Met Asp Pro Gln
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Gln Arg Leu Ala Leu Glu Leu Gly Trp Glu Ala Leu Glu Arg Ala Gly
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Ile Asp Pro Ser Ser Leu Thr Gly Thr Arg Thr Gly Val Phe Ala Gly
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 260          265          270
Ser Leu Arg Arg Gly Glu Ser Glu Leu Ala Leu Ala Gly Gly Val Ser
 275          280          285
Leu Asn Leu Val Pro Asp Ser Ile Ile Gly Ala Ser Lys Phe Gly Gly
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Leu Ser Pro Asp Gly Arg Ala Tyr Thr Phe Asp Ala Arg Ala Asn Gly
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Tyr Val Arg Gly Glu Gly Gly Gly Phe Val Val Leu Lys Arg Leu Ser
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Gln	Ala	Gln	Glu	Ala	Val	Leu	Arg	Glu	Ala	His	Glu	Arg	Ala	Gly	Thr	370	375	380
Ala	Pro	Ala	Asp	Val	Arg	Tyr	Val	Glu	Leu	His	Gly	Thr	Gly	Thr	Pro	385	390	400
Val	Gly	Asp	Pro	Ile	Glu	Ala	Ala	Ala	Leu	Gly	Ala	Ala	Leu	Gly	Thr	405	410	415
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Thr	Glu	Tyr	Leu	Pro	Trp	Glu	Pro	Glu	His	Asp	Gly	Gln	Arg	Met	Val	485	490	495
Val	Gly	Val	Ser	Ser	Phe	Gly	Met	Gly	Gly	Thr	Asn	Ala	His	Val	Val	500	505	510
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Ser	Ala	Lys	Ser	Ala	Ala	Ala	Leu	Asp	Ala	Gln	Ile	Glu	Arg	Leu	Ala	545	550	555
Ala	Phe	Ala	Ser	Arg	Asp	Arg	Thr	Asp	Gly	Val	Asp	Ala	Gly	Ala	Val	565	570	575
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Gly	Arg	Ala	Gln	Phe	Glu	His	Arg	Ala	Val	Val	Val	Gly	Ser	Gly	Pro	595	600	605
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Leu	Glu	Arg	Val	Asp	Val	Val	Gln	Pro	Val	Thr	Phe	Ala	Val	Met	Val	690	695	700
Ser	Leu	Ala	Arg	Val	Trp	Gln	His	His	Gly	Val	Thr	Pro	Gln	Ala	Val	705	710	715
Val	Gly	His	Ser	Gln	Gly	Glu	Ile	Ala	Ala	Ala	Tyr	Val	Ala	Gly	Ala	725	730	735
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 Ala Thr Val Val Ser Gly Asp Pro Val Gln Ile Glu Glu Leu Ala Gln  
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Ala	Cys	Lys	Ala	Asp	Gly	Phe	Arg	Ala	Arg	Ile	Ile	Pro	Val	Asp	Tyr	1825	1830	1835	1840
Ala	Ser	His	Ser	Arg	Gln	Val	Glu	Ile	Ile	Glu	Ser	Glu	Leu	Ala	Gln	1845	1850	1855	
Val	Leu	Ala	Gly	Leu	Ser	Pro	Gln	Ala	Pro	Arg	Val	Pro	Phe	Phe	Ser	1860	1865	1870	
Thr	Leu	Glu	Gly	Thr	Trp	Ile	Thr	Glu	Pro	Val	Leu	Asp	Gly	Thr	Tyr	1875	1880	1885	
Trp	Tyr	Arg	Asn	Leu	Arg	His	Arg	Val	Gly	Phe	Ala	Pro	Ala	Ile	Glu	1890	1895	1900	
Thr	Leu	Ala	Val	Asp	Glu	Gly	Phe	Thr	His	Phe	Val	Glu	Val	Ser	Ala	1905	1910	1915	1920
His	Pro	Val	Leu	Thr	Met	Thr	Leu	Pro	Glu	Thr	Val	Thr	Gly	Leu	Gly	1925	1930	1935	
Thr	Leu	Arg	Arg	Glu	Gln	Gly	Gly	Gln	Glu	Arg	Leu	Val	Thr	Ser	Leu	1940	1945	1950	
Ala	Glu	Ala	Trp	Val	Asn	Gly	Leu	Pro	Val	Ala	Trp	Thr	Ser	Leu	Leu	1955	1960	1965	
Pro	Ala	Thr	Ala	Ser	Arg	Pro	Gly	Leu	Pro	Thr	Tyr	Ala	Phe	Gln	Ala	1970	1975	1980	
Glu	Arg	Tyr	Trp	Leu	Glu	Asn	Thr	Pro	Ala	Ala	Leu	Ala	Thr	Gly	Asp	1985	1990	1995	2000
Asp	Trp	Arg	Tyr	Arg	Ile	Asp	Trp	Lys	Arg	Leu	Pro	Ala	Ala	Glu	Gly	2005	2010	2015	
Ser	Glu	Arg	Thr	Gly	Leu	Ser	Gly	Arg	Trp	Leu	Ala	Val	Thr	Pro	Glu	2020	2025	2030	
Asp	His	Ser	Ala	Gln	Ala	Ala	Ala	Val	Leu	Thr	Ala	Leu	Val	Asp	Ala	2035	2040	2045	
Gly	Ala	Lys	Val	Glu	Val	Leu	Thr	Ala	Gly	Ala	Asp	Asp	Asp	Arg	Glu	2050	2055	2060	
Ala	Leu	Ala	Ala	Arg	Leu	Thr	Ala	Leu	Thr	Thr	Gly	Asp	Gly	Phe	Thr	2065	2070	2075	2080
Gly	Val	Val	Ser	Leu	Leu	Asp	Gly	Leu	Val	Pro	Gln	Val	Ala	Trp	Val	2085	2090	2095	
Gln	Ala	Leu	Gly	Asp	Ala	Gly	Ile	Lys	Ala	Pro	Leu	Trp	Ser	Val	Thr	2100	2105	2110	
Gln	Gly	Ala	Val	Ser	Val	Gly	Arg	Leu	Asp	Thr	Pro	Ala	Asp	Pro	Asp	2115	2120	2125	
Arg	Ala	Met	Leu	Trp	Gly	Leu	Gly	Arg	Val	Val	Ala	Leu	Glu	His	Pro	2130	2135	2140	
Glu	Arg	Trp	Ala	Gly	Leu	Val	Asp	Leu	Pro	Ala	Gln	Pro	Asp	Ala	Ala	2145	2150	2155	2160
Ala	Leu	Ala	His	Leu	Val	Thr	Ala	Leu	Ser	Gly	Ala	Thr	Gly	Glu	Asp	2165	2170	2175	
Gln	Ile	Ala	Ile	Arg	Thr	Thr	Gly	Leu	His	Ala	Arg	Arg	Leu	Ala	Arg	2180	2185	2190	
Ala	Pro	Leu	His	Gly	Arg	Arg	Pro	Thr	Arg	Asp	Trp	Gln	Pro	His	Gly	2195	2200	2205	
Thr	Val	Leu	Ile	Thr	Gly	Gly	Thr	Gly	Ala	Leu	Gly	Ser	His	Ala	Ala	2210	2215	2220	
Arg	Trp	Met	Ala	His	His	Gly	Ala	Glu	His	Leu	Leu	Leu	Val	Ser	Arg	2225	2230	2235	2240
Ser	Gly	Glu	Gln	Ala	Pro	Gly	Ala	Thr	Gln	Leu	Thr	Ala	Glu	Leu	Thr	2245	2250	2255	
Ala	Ser	Gly	Ala	Arg	Val	Thr	Ile	Ala	Ala	Cys	Asp	Val	Ala	Asp	Pro	2260	2265	2270	
His	Ala	Met	Arg	Thr	Leu	Leu	Asp	Ala	Ile	Pro	Ala	Glu	Thr	Pro	Leu	2275	2280	2285	
Thr	Ala	Val	Val	His	Thr	Ala	Gly	Ala	Leu	Asp	Asp	Gly	Ile	Val	Asp	2290	2295	2300	
Thr	Leu	Thr	Ala	Glu	Gln	Val	Arg	Arg	Ala	His	Arg	Ala	Lys	Ala	Val	2305	2310	2315	2320

Gly Ala Ser Val Leu Asp Glu Leu Thr Arg Asp Leu Asp Leu Asp Ala  
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<211> 11220

<212> DNA

<213> Streptomyces venezuelae

<400> 32

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Gly	Phe	Thr	His	Phe	Ile	Glu	Val	Ser	Ala	His	Pro	Val	Leu	Thr	Met	835	840	845	
Thr	Leu	Pro	Glu	Thr	Val	Thr	Gly	Leu	Gly	Thr	Leu	Arg	Arg	Glu	Gln	850	855	860	
Gly	Gly	Gln	Glu	Arg	Leu	Val	Thr	Ser	Leu	Ala	Glu	Ala	Trp	Thr	Asn	865	870	875	880
Gly	Leu	Thr	Ile	Asp	Trp	Ala	Pro	Val	Leu	Pro	Thr	Ala	Thr	Gly	His	885	890	895	
His	Pro	Glu	Leu	Pro	Thr	Tyr	Ala	Phe	Gln	Arg	Arg	His	Tyr	Trp	Leu	900	905	910	
His	Asp	Ser	Pro	Ala	Val	Gln	Gly	Ser	Val	Gln	Asp	Ser	Trp	Arg	Tyr	915	920	925	
Arg	Ile	Asp	Trp	Lys	Arg	Leu	Ala	Val	Ala	Asp	Ala	Ser	Glu	Arg	Ala	930	935	940	
Gly	Leu	Ser	Gly	Arg	Trp	Leu	Val	Val	Val	Pro	Glu	Asp	Arg	Ser	Ala	945	950	955	960
Glu	Ala	Ala	Pro	Val	Leu	Ala	Ala	Leu	Ser	Gly	Ala	Gly	Ala	Asp	Pro	965	970	975	
Val	Gln	Leu	Asp	Val	Ser	Pro	Leu	Gly	Asp	Arg	Gln	Arg	Leu	Ala	Ala	980	985	990	
Thr	Leu	Gly	Glu	Ala	Leu	Ala	Ala	Ala	Gly	Gly	Ala	Val	Asp	Gly	Val	995	1000	1005	
Leu	Ser	Leu	Leu	Ala	Trp	Asp	Glu	Ser	Ala	His	Pro	Gly	His	Pro	Ala	1010	1015	1020	
Pro	Phe	Thr	Arg	Gly	Thr	Gly	Ala	Thr	Leu	Thr	Leu	Val	Gln	Ala	Leu	1025	1030	1035	1040



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 Val Trp Gly Met Gly Arg Val Ala Ala Leu Glu His Pro Glu Arg Trp  
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 Gly Gly Leu Ile Asp Leu Pro Ser Asp Ala Asp Arg Ala Ala Leu Asp  
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 Ala Gly Val Ser Asp Ala His Pro Leu Ser Ala Val Leu His Leu Pro  
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 Ala Arg Val Val Thr Ala Lys Ala Thr Ala Ala Leu His Leu Asp Arg  
 1265 1270 1275 1280  
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 Tyr Ala Ala Gly Thr Ala Phe Leu Asp Ala Leu Ala Gly Gln His Arg  
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 Arg Leu Lys Asn Ala Thr Gly Leu Ala Leu Pro Ala Thr Leu Val Phe  
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 Asp Tyr Pro Thr Pro Arg Thr Leu Ala Glu Phe Leu Leu Ala Glu Ile  
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 Leu Gly Glu Gln Ala Gly Ala Gly Glu Gln Leu Pro Val Asp Gly Gly  
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Val Asp Asp Glu Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu Pro  
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Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Arg Leu Val Ala Gly Gly  
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Pro Thr Thr Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Glu Asp  
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Asn Gly His Arg Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln  
1795 1800 1805  
Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln  
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Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Thr Thr Ala Asp  
1825 1830 1835 1840  
Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp Pro  
1845 1850 1855  
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Glu Gln Pro Leu Arg Leu Gly Ser Leu Lys Ser Asn Ile Gly His Thr  
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Pro Val Asp Glu Asp Ala Pro Ala Asp Glu Pro Ser Val Gly Gly Val  
1970 1975 1980  
Val Pro Trp Leu Val Ser Ala Lys Thr Pro Ala Ala Leu Asp Ala Gln  
1985 1990 1995 2000  
Ile Gly Arg Leu Ala Ala Phe Ala Ser Gln Gly Arg Thr Asp Ala Ala  
2005 2010 2015  
Asp Pro Gly Ala Val Ala Arg Val Leu Ala Gly Gly Arg Ala Gln Phe  
2020 2025 2030

Glu His Arg Ala Val Ala Leu Gly Thr Gly Gln Asp Asp Leu Ala Ala  
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 Ala Leu Ala Ala Pro Glu Gly Leu Val Arg Gly Val Ala Ser Gly Val  
 2050 2055 2060  
 Gly Arg Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly  
 2065 2070 2075 2080  
 Met Gly Ala Glu Leu Leu Asp Val Ser Lys Glu Phe Ala Ala Ala Met  
 2085 2090 2095  
 Ala Glu Cys Glu Ala Ala Leu Ala Pro Tyr Val Asp Trp Ser Leu Glu  
 2100 2105 2110  
 Ala Val Val Arg Gln Ala Pro Gly Ala Pro Thr Leu Glu Arg Val Asp  
 2115 2120 2125  
 Val Val Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Lys Val  
 2130 2135 2140  
 Trp Gln His His Gly Val Thr Pro Gln Ala Val Val Gly His Ser Gln  
 2145 2150 2155 2160  
 Gly Glu Ile Ala Ala Tyr Val Ala Gly Ala Leu Ser Leu Asp Asp  
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 Ala Ala Arg Val Val Thr Leu Arg Ser Lys Ser Ile Gly Ala His Leu  
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 Ala Gly Gln Gly Gly Met Leu Ser Leu Ala Leu Ser Glu Ala Ala Val  
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 2225 2230 2235 2240  
 Leu Ala Gln Ala Cys Glu Ala Asp Gly Val Arg Ala Arg Ile Ile Pro  
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 Val Asp Tyr Ala Ser His Ser Ala His Val Glu Thr Ile Glu Ser Glu  
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 Gly Gly Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro  
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 Gly Leu Gly Thr Leu Arg Arg Asp Asn Gly Gly Gln His Arg Leu Thr  
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 Thr Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu Thr Val Asp Trp Ala  
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 Gly Asp Gln Val Gly Cys Asp Leu Val Glu Glu Leu Thr Leu Asp Ala  
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Pro	Glu	Asp	Ala	Pro	Gly	Glu	Ala	Glu	Trp	Thr	Arg	His	Ala	Thr	Gly	2530	2535	2540
Val	Leu	Ala	Ala	Arg	Ala	Asp	Arg	Thr	Ala	Pro	Val	Ala	Asp	Pro	Glu	2545	2550	2555
Ala	Trp	Pro	Pro	Pro	Gly	Ala	Glu	Pro	Val	Asp	Val	Asp	Gly	Leu	Tyr	2565	2570	2575
Glu	Arg	Phe	Ala	Ala	Asn	Gly	Tyr	Gly	Tyr	Gly	Pro	Leu	Phe	Gln	Gly	2580	2585	2590
Val	Arg	Gly	Val	Trp	Arg	Arg	Gly	Asp	Glu	Val	Phe	Ala	Asp	Val	Ala	2595	2600	2605
Leu	Pro	Ala	Glu	Val	Ala	Gly	Ala	Glu	Gly	Ala	Arg	Phe	Gly	Leu	His	2610	2615	2620
Pro	Ala	Leu	Leu	Asp	Ala	Ala	Val	Gln	Ala	Ala	Gly	Ala	Gly	Arg	Gly	2625	2630	2635
Val	Arg	Arg	Gly	His	Ala	Ala	Ala	Val	Arg	Leu	Glu	Arg	Asp	Leu	Leu	2645	2650	2655
Tyr	Ala	Val	Gly	Ala	Thr	Ala	Leu	Arg	Val	Arg	Leu	Ala	Pro	Ala	Gly	2660	2665	2670
Pro	Asp	Thr	Val	Ser	Val	Ser	Ala	Ala	Asp	Ser	Ser	Gly	Gln	Pro	Val	2675	2680	2685
Phe	Ala	Ala	Asp	Ser	Leu	Thr	Val	Leu	Pro	Val	Asp	Pro	Ala	Gln	Leu	2690	2695	2700
Ala	Ala	Phe	Ser	Asp	Pro	Thr	Leu	Asp	Ala	Leu	His	Leu	Leu	Glu	Trp	2705	2710	2715
Thr	Ala	Trp	Asp	Gly	Ala	Ala	Gln	Ala	Leu	Pro	Gly	Ala	Val	Val	Leu	2725	2730	2735
Gly	Gly	Asp	Ala	Asp	Gly	Leu	Ala	Ala	Leu	Arg	Ala	Gly	Gly	Thr		2740	2745	2750
Glu	Val	Leu	Ser	Phe	Pro	Asp	Leu	Thr	Asp	Leu	Val	Glu	Ala	Val	Asp	2755	2760	2765
Arg	Gly	Glu	Thr	Pro	Ala	Pro	Ala	Thr	Val	Leu	Val	Ala	Cys	Pro	Ala	2770	2775	2780
Ala	Gly	Pro	Asp	Gly	Pro	Glu	His	Val	Arg	Glu	Ala	Leu	His	Gly	Ser	2785	2790	2795
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Ala	Gln	Thr	Glu	Ser	Pro	Gly	Arg	Phe	Val	Leu	Leu	Asp	Leu	Ala	Gly	2850	2855	2860
Glu	Ala	Arg	Thr	Ala	Gly	Asp	Ala	Thr	Ala	Gly	Asp	Gly	Leu	Thr	Thr	2865	2870	2875
Gly	Asp	Ala	Thr	Val	Gly	Gly	Thr	Ser	Gly	Asp	Ala	Ala	Leu	Gly	Ser	2885	2890	2895
Ala	Leu	Ala	Thr	Ala	Leu	Gly	Ser	Gly	Glu	Pro	Gln	Leu	Ala	Leu	Arg	2900	2905	2910
Asp	Gly	Ala	Leu	Leu	Val	Pro	Arg	Leu	Ala	Arg	Ala	Ala	Ala	Pro	Ala	2915	2920	2925
Ala	Ala	Asp	Gly	Leu	Ala	Ala	Ala	Asp	Gly	Leu	Ala	Ala	Leu	Pro	Leu	2930	2935	2940
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Leu	Asn	Phe	Arg	Asp	Val	Leu	Ile	Ala	Leu	Gly	Met	Tyr	Pro	Asp	Pro	2995	3000	3005
Ala	Leu	Met	Gly	Thr	Glu	Gly	Ala	Gly	Val	Val	Thr	Ala	Thr	Gly	Pro	3010	3015	3020

Gly Val Thr His Leu Ala Pro Gly Asp Arg Val Met Gly Leu Leu Ser  
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<212> DNA
<213> Streptomyces venezuelae
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102



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Thr	His	Glu	Pro	Val	Ala	Ile	Val	Gly	Met	Ala	Cys	Arg	Leu	Pro	Gly	
		35					40					45				
Gly	Val	Ala	Ser	Pro	Glu	Asp	Leu	Trp	Gln	Leu	Val	Ala	Gly	Asp	Gly	
	50					55					60					
Asp	Ala	Ile	Ser	Glu	Phe	Pro	Gln	Asp	Arg	Gly	Trp	Asp	Val	Glu	Gly	
65					70				75						80	
Leu	Tyr	Asp	Pro	Asp	Pro	Asp	Ala	Ser	Gly	Arg	Thr	Tyr	Cys	Arg	Ser	
				85					90					95		
Gly	Gly	Phe	Leu	His	Asp	Ala	Gly	Glu	Phe	Asp	Ala	Asp	Phe	Phe	Gly	
			100					105					110			
Ile	Ser	Pro	Arg	Glu	Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg	Leu	Ser	
		115					120					125				
Leu	Thr	Thr	Ala	Trp	Glu	Ala	Ile	Glu	Ser	Ala	Gly	Ile	Asp	Pro	Thr	
	130					135					140					
Ala	Leu	Lys	Gly	Ser	Gly	Leu	Gly	Val	Phe	Val	Gly	Gly	Trp	His	Thr	
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Gly	His	Leu	Val	Ser	Gly	Ala	Ala	Leu	Gly	Phe	Leu	Ser	Gly	Arg	Ile	
		180						185					190			
Ala	Tyr	Val	Leu	Gly	Thr	Asp	Gly	Pro	Ala	Leu	Thr	Val	Asp	Thr	Ala	
	195						200					205				
Cys	Ser	Ser	Ser	Leu	Val	Ala	Leu	His	Leu	Ala	Val	Gln	Ala	Leu	Arg	
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Lys	Gly	Glu	Cys	Asp	Met	Ala	Leu	Ala	Gly	Gly	Val	Thr	Val	Met	Pro	
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Asp	Gly	Arg	Ser	Lys	Ala	Phe	Ala	Thr	Ser	Ala	Asp	Gly	Phe	Gly	Pro	
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Arg	Asn	Gly	His	Arg	Ile	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn	
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Gln	Arg	Val	Ile	Arg	Arg	Ala	Leu	Ala	Asp	Ala	Arg	Leu	Ala	Pro	Gly	
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Asp	Val	Asp	Val	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Arg	Leu	Gly	Asp	
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Pro	Ile	Glu	Ala	Gln	Ala	Leu	Ile	Ala	Thr	Tyr	Gly	Gln	Glu	Lys	Ser	
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Ser	Glu	Gln	Pro	Leu	Arg	Leu	Gly	Ala	Leu	Lys	Ser	Asn	Ile	Gly	His	
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Met	Arg	His	Gly	Leu	Leu	Pro	Lys	Thr	Leu	His	Val	Asp	Glu	Pro	Ser	
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Asp	Gln	Ile	Asp	Trp	Ser	Ala	Gly	Thr	Val	Glu	Leu	Leu	Thr	Glu	Ala	
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Val	Asp	Trp	Pro	Glu	Lys	Gln	Asp	Gly	Gly	Leu	Arg	Arg	Ala	Ala	Val	
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Ser	Ser	Phe	Gly	Ile	Ser	Gly	Thr	Asn	Ala	His	Val	Val	Leu	Glu	Glu	
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Gly	Val	Val	Pro	Trp	Pro	Val	Ser	Ala	Lys	Thr	Pro	Ala	Ala	Leu	Asp	
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Ala	Gln	Ile	Gly	Gln	Leu	Ala	Ala	Tyr	Ala	Asp	Gly	Arg	Thr	Asp	Val	
			500					505					510			



Asp	Pro	Ala	Val	Ala	Ala	Arg	Ala	Leu	Val	Asp	Ser	Arg	Thr	Ala	Met	515	520	525
Glu	His	Arg	Ala	Val	Ala	Val	Gly	Asp	Ser	Arg	Glu	Ala	Leu	Arg	Asp	530	535	540
Ala	Leu	Arg	Met	Pro	Glu	Gly	Leu	Val	Arg	Gly	Thr	Ser	Ser	Asp	Val	545	550	555
Gly	Arg	Val	Ala	Phe	Val	Phe	Pro	Gly	Gln	Gly	Thr	Gln	Trp	Ala	Gly	565	570	575
Met	Gly	Ala	Glu	Leu	Leu	Asp	Ser	Ser	Pro	Glu	Phe	Ala	Ala	Ser	Met	580	585	590
Ala	Glu	Cys	Glu	Thr	Ala	Leu	Ser	Arg	Tyr	Val	Asp	Trp	Ser	Leu	Glu	595	600	605
Ala	Val	Val	Arg	Gln	Glu	Pro	Gly	Ala	Pro	Thr	Leu	Asp	Arg	Val	Asp	610	615	620
Val	Val	Gln	Pro	Val	Thr	Phe	Ala	Val	Met	Val	Ser	Leu	Ala	Lys	Val	625	630	635
Trp	Gln	His	His	Gly	Ile	Thr	Pro	Gln	Ala	Val	Val	Gly	His	Ser	Gln	645	650	655
Gly	Glu	Ile	Ala	Ala	Ala	Tyr	Val	Ala	Gly	Ala	Leu	Thr	Leu	Asp	Asp	660	665	670
Ala	Ala	Arg	Val	Val	Thr	Leu	Arg	Ser	Lys	Ser	Ile	Ala	Ala	His	Leu	675	680	685
Ala	Gly	Lys	Gly	Gly	Met	Ile	Ser	Leu	Ala	Leu	Asp	Glu	Ala	Ala	Val	690	695	700
Leu	Lys	Arg	Leu	Ser	Asp	Phe	Asp	Gly	Leu	Ser	Val	Ala	Ala	Val	Asn	705	710	715
Gly	Pro	Thr	Ala	Thr	Val	Val	Ser	Gly	Asp	Pro	Thr	Gln	Ile	Glu	Glu	725	730	735
Leu	Ala	Arg	Thr	Cys	Glu	Ala	Asp	Gly	Val	Arg	Ala	Arg	Ile	Ile	Pro	740	745	750
Val	Asp	Tyr	Ala	Ser	His	Ser	Arg	Gln	Val	Glu	Ile	Ile	Glu	Lys	Glu	755	760	765
Leu	Ala	Glu	Val	Leu	Ala	Gly	Leu	Ala	Pro	Gln	Ala	Pro	His	Val	Pro	770	775	780
Phe	Phe	Ser	Thr	Leu	Glu	Gly	Thr	Trp	Ile	Thr	Glu	Pro	Val	Leu	Asp	785	790	795
Gly	Thr	Tyr	Trp	Tyr	Arg	Asn	Leu	Arg	His	Arg	Val	Gly	Phe	Ala	Pro	805	810	815
Ala	Val	Glu	Thr	Leu	Ala	Val	Asp	Gly	Phe	Thr	His	Phe	Ile	Glu	Val	820	825	830
Ser	Ala	His	Pro	Val	Leu	Thr	Met	Thr	Leu	Pro	Glu	Thr	Val	Thr	Gly	835	840	845
Leu	Gly	Thr	Leu	Arg	Arg	Glu	Gln	Gly	Gly	Gln	Glu	Arg	Leu	Val	Thr	850	855	860
Ser	Leu	Ala	Glu	Ala	Trp	Ala	Asn	Gly	Leu	Thr	Ile	Asp	Trp	Ala	Pro	865	870	875
Ile	Leu	Pro	Thr	Ala	Thr	Gly	His	His	Pro	Glu	Leu	Pro	Thr	Tyr	Ala	885	890	895
Phe	Gln	Thr	Glu	Arg	Phe	Trp	Leu	Gln	Ser	Ser	Ala	Pro	Thr	Ser	Ala	900	905	910
Ala	Asp	Asp	Trp	Arg	Tyr	Arg	Val	Glu	Trp	Lys	Pro	Leu	Thr	Ala	Ser	915	920	925
Gly	Gln	Ala	Asp	Leu	Ser	Gly	Arg	Trp	Ile	Val	Ala	Val	Gly	Ser	Glu	930	935	940
Pro	Glu	Ala	Glu	Leu	Leu	Gly	Ala	Leu	Lys	Ala	Ala	Gly	Ala	Glu	Val	945	950	955
Asp	Val	Leu	Glu	Ala	Gly	Ala	Asp	Asp	Asp	Arg	Glu	Ala	Leu	Ala	Ala	965	970	975
Arg	Leu	Thr	Ala	Leu	Thr	Thr	Gly	Asp	Gly	Phe	Thr	Gly	Val	Val	Ser	980	985	990
Leu	Leu	Asp	Asp	Leu	Val	Pro	Gln	Val	Ala	Trp	Val	Gln	Ala	Leu	Gly	995	1000	1005

Asp	Ala	Gly	Ile	Lys	Ala	Pro	Leu	Trp	Ser	Val	Thr	Gln	Gly	Ala	Val	1010	1015	1020
Ser	Val	Gly	Arg	Leu	Asp	Thr	Pro	Ala	Asp	Pro	Asp	Arg	Ala	Met	Leu	1025	1030	1035
Trp	Gly	Leu	Gly	Arg	Val	Val	Ala	Leu	Glu	His	Pro	Glu	Arg	Trp	Ala	1045	1050	1055
Gly	Leu	Val	Asp	Leu	Pro	Ala	Gln	Pro	Asp	Ala	Ala	Ala	Leu	Ala	His	1060	1065	1070
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Arg	Thr	Thr	Gly	Leu	His	Ala	Arg	Arg	Leu	Ala	Arg	Ala	Pro	Leu	His	1090	1095	1100
Gly	Arg	Arg	Pro	Thr	Arg	Asp	Trp	Gln	Pro	His	Gly	Thr	Val	Leu	Ile	1105	1110	1115
Thr	Gly	Gly	Thr	Gly	Ala	Leu	Gly	Ser	His	Ala	Ala	Arg	Trp	Met	Ala	1125	1130	1135
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Ala	Pro	Gly	Ala	Thr	Gln	Leu	Thr	Ala	Glu	Leu	Thr	Ala	Ser	Gly	Ala	1155	1160	1165
Arg	Val	Thr	Ile	Ala	Ala	Cys	Asp	Val	Ala	Asp	Pro	His	Ala	Met	Arg	1170	1175	1180
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His	Thr	Ala	Gly	Ala	Pro	Gly	Gly	Asp	Pro	Leu	Asp	Val	Thr	Gly	Pro	1205	1210	1215
Glu	Asp	Ile	Ala	Arg	Ile	Leu	Gly	Ala	Lys	Thr	Ser	Gly	Ala	Glu	Val	1220	1225	1230
Leu	Asp	Asp	Leu	Leu	Arg	Gly	Thr	Pro	Leu	Asp	Ala	Phe	Val	Leu	Tyr	1235	1240	1245
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Pro	Met	Ser	Pro	Asp	Arg	Ala	Leu	Asp	Glu	Leu	Ala	Lys	Ala	Leu	Ser	1315	1320	1325
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Ala	Pro	Ala	Phe	Thr	Val	Ser	Arg	Pro	Ser	Leu	Leu	Leu	Asp	Gly	Val	1345	1350	1355
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Ala	Val	Gln	Leu	Arg	Asn	Gln	Leu	Ser	Thr	Val	Val	Gly	Asn	Arg	Leu	1445	1450	1455
Pro	Ala	Thr	Thr	Val	Phe	Asp	His	Pro	Thr	Pro	Ala	Ala	Leu	Ala	Ala	1460	1465	1470
His	Leu	His	Glu	Ala	Tyr	Leu	Ala	Pro	Ala	Glu	Pro	Ala	Pro	Thr	Asp	1475	1480	1485
Trp	Glu	Gly	Arg	Val	Arg	Arg	Ala	Leu	Ala	Glu	Leu	Pro	Leu	Asp	Arg	1490	1495	1500

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<212> PRT

<213> Streptomyces venezuelae

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Arg	Gln	Glu	Pro	Met	Ala	Ile	Val	Gly	Met	Ser	Cys	Arg	Phe	Ala	Gly
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Leu	Tyr	Asp	Pro	Val	Pro	Gly	Arg	Lys	Gly	Thr	Thr	Tyr	Val	Arg	Asn
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Ile	Ser	Pro	Arg	Glu	Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg	Gln	Leu
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Leu	Glu	Ala	Ser	Trp	Glu	Val	Phe	Glu	Arg	Ala	Gly	Ile	Asp	Pro	Ala
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Ser	Val	Arg	Gly	Thr	Asp	Val	Gly	Val	Tyr	Val	Gly	Cys	Gly	Tyr	Gln
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Val	Val	Thr	Gly	Asn	Ser	Ser	Ala	Val	Ala	Ser	Gly	Arg	Ile	Ala	Tyr
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Ser	Leu	Gly	Leu	Glu	Gly	Pro	Ala	Val	Thr	Val	Asp	Thr	Ala	Cys	Ser
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Arg	Thr	Lys	Gly	Phe	Ala	Ser	Ala	Ala	Asp	Gly	Leu	Ala	Trp	Gly	Glu
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Gly	Val	Ala	Val	Leu	Leu	Leu	Glu	Arg	Leu	Ser	Asp	Ala	Arg	Arg	Lys
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Gly	His	Arg	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Ile	Asn	Gln	Asp
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Asp	Val	Val	Glu	Gly	His	Gly	Thr	Gly	Thr	Arg	Leu	Gly	Asp	Pro	Ile
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Glu	Ala	Gln	Ala	Leu	Leu	Ala	Thr	Tyr	Gly	Gln	Gly	Arg	Ala	Pro	Gly
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Leu	Ala	Trp	Gly	Pro	Gly	Ala	Glu	Asp	Leu	Asp	Glu	Glu	Gly	Arg	Arg	930	935	940
Ser	Ala	Val	Leu	Ala	Met	Val	Met	Arg	Gln	Ala	Ala	Ser	Val	Leu	Arg	945	950	955
Cys	Asp	Ser	Pro	Glu	Glu	Val	Pro	Val	Asp	Arg	Pro	Leu	Arg	Glu	Ile	965	970	975
Gly	Phe	Asp	Ser	Leu	Thr	Ala	Val	Asp	Phe	Arg	Asn	Arg	Val	Asn	Arg	980	985	990
Leu	Thr	Gly	Leu	Gln	Leu	Pro	Pro	Thr	Val	Val	Phe	Gln	His	Pro	Thr	995	1000	1005
Pro	Val	Ala	Leu	Ala	Glu	Arg	Ile	Ser	Asp	Glu	Leu	Ala	Glu	Arg	Asn	1010	1015	1020
Trp	Ala	Val	Ala	Glu	Pro	Ser	Asp	His	Glu	Gln	Ala	Glu	Glu	Glu	Lys	1025	1030	1035
Ala	Ala	Ala	Pro	Ala	Gly	Ala	Arg	Ser	Gly	Ala	Asp	Thr	Gly	Ala	Gly	1045	1050	1055
Ala	Gly	Met	Phe	Arg	Ala	Leu	Phe	Arg	Gln	Ala	Val	Glu	Asp	Asp	Arg	1060	1065	1070
Tyr	Gly	Glu	Phe	Leu	Asp	Val	Leu	Ala	Glu	Ala	Ser	Ala	Phe	Arg	Pro	1075	1080	1085
Gln	Phe	Ala	Ser	Pro	Glu	Ala	Cys	Ser	Glu	Arg	Leu	Asp	Pro	Val	Leu	1090	1095	1100
Leu	Ala	Gly	Gly	Pro	Thr	Asp	Arg	Ala	Glu	Gly	Arg	Ala	Val	Leu	Val	1105	1110	1115
Gly	Cys	Thr	Gly	Thr	Ala	Ala	Asn	Gly	Gly	Pro	His	Glu	Phe	Leu	Arg	1125	1130	1135
Leu	Ser	Thr	Ser	Phe	Gln	Glu	Glu	Arg	Asp	Phe	Leu	Ala	Val	Pro	Leu	1140	1145	1150
Pro	Gly	Tyr	Gly	Thr	Gly	Thr	Gly	Thr	Gly	Thr	Ala	Leu	Leu	Pro	Ala	1155	1160	1165
Asp	Leu	Asp	Thr	Ala	Leu	Asp	Ala	Gln	Ala	Arg	Ala	Ile	Leu	Arg	Ala	1170	1175	1180
Ala	Gly	Asp	Ala	Pro	Val	Val	Leu	Leu	Gly	His	Ser	Gly	Gly	Ala	Leu	1185	1190	1195
Leu	Ala	His	Glu	Leu	Ala	Phe	Arg	Leu	Glu	Arg	Ala	His	Gly	Ala	Pro	1205	1210	1215
Pro	Ala	Gly	Ile	Val	Leu	Val	Asp	Pro	Tyr	Pro	Pro	Gly	His	Gln	Glu	1220	1225	1230
Pro	Ile	Glu	Val	Trp	Ser	Arg	Gln	Leu	Gly	Glu	Gly	Leu	Phe	Ala	Gly	1235	1240	1245
Glu	Leu	Glu	Pro	Met	Ser	Asp	Ala	Arg	Leu	Leu	Ala	Met	Gly	Arg	Tyr	1250	1255	1260

Ala Arg Phe Leu Ala Gly Pro Arg Pro Gly Arg Ser Ser Ala Pro Val  
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Leu Leu Val Arg Ala Ser Glu Pro Leu Gly Asp Trp Gln Glu Glu Arg  
1285 1290 1295  
Gly Asp Trp Arg Ala His Trp Asp Leu Pro His Thr Val Ala Asp Val  
1300 1305 1310  
Pro Gly Asp His Phe Thr Met Met Arg Asp His Ala Pro Ala Val Ala  
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Glu Ala Val Leu Ser Trp Leu Asp Ala Ile Glu Gly Ile Glu Gly Ala  
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Gly Lys  
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<212> DNA  
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gcccaccggg tgcgcacccc cgagggggac gaggtgtggc tggtcgtcgg ctacgaccgg 180  
gcgcgggccc tcctcgccga tccccggttc agcaaggact ggcgcaactc cacgactccc 240  
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35 40 45  
Gly Asp Glu Val Trp Leu Val Val Gly Tyr Asp Arg Ala Arg Ala Val  
50 55 60  
Leu Ala Asp Pro Arg Phe Ser Lys Asp Trp Arg Asn Ser Thr Thr Pro  
65 70 75 80  
Leu Thr Glu Ala Glu Ala Ala Leu Asn His Asn Met Leu Glu Ser Asp  
85 90 95  
Pro Pro Arg His Thr Arg Leu Arg Lys Leu Val Ala Arg Glu Phe Thr  
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Met	Arg	Arg	Val	Glu	Leu	Leu	Arg	Pro	Arg	Val	Gln	Glu	Ile	Val	Asp
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Gly	Leu	Val	Asp	Ala	Met	Leu	Ala	Ala	Pro	Asp	Gly	Arg	Ala	Asp	Leu
	130					135					140				
Met	Glu	Ser	Leu	Ala	Trp	Pro	Leu	Pro	Ile	Thr	Val	Ile	Ser	Glu	Leu
	145				150					155					160
Leu	Gly	Val	Pro	Glu	Pro	Asp	Arg	Ala	Ala	Phe	Arg	Val	Trp	Thr	Asp
			165					170						175	
Ala	Phe	Val	Phe	Pro	Asp	Asp	Pro	Ala	Gln	Ala	Gln	Thr	Ala	Met	Ala
			180					185					190		
Glu	Met	Ser	Gly	Tyr	Leu	Ser	Arg	Leu	Ile	Asp	Ser	Lys	Arg	Gly	Gln
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Asp	Gly	Glu	Asp	Leu	Leu	Ser	Ala	Leu	Val	Arg	Thr	Ser	Asp	Glu	Asp
	210					215					220				
Gly	Ser	Arg	Leu	Thr	Ser	Glu	Glu	Leu	Leu	Gly	Met	Ala	His	Ile	Leu
	225				230					235					240
Leu	Val	Ala	Gly	His	Glu	Thr	Thr	Val	Asn	Leu	Ile	Ala	Asn	Gly	Met
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Tyr	Ala	Leu	Leu	Ser	His	Pro	Asp	Gln	Leu	Ala	Ala	Leu	Arg	Ala	Asp
		260						265					270		
Met	Thr	Leu	Leu	Asp	Gly	Ala	Val	Glu	Glu	Met	Leu	Arg	Tyr	Glu	Gly
		275					280					285			
Pro	Val	Glu	Ser	Ala	Thr	Tyr	Arg	Phe	Pro	Val	Glu	Pro	Val	Asp	Leu
	290					295					300				
Asp	Gly	Thr	Val	Ile	Pro	Ala	Gly	Asp	Thr	Val	Leu	Val	Val	Leu	Ala
	305				310					315					320
Asp	Ala	His	Arg	Thr	Pro	Glu	Arg	Phe	Pro	Asp	Pro	His	Arg	Phe	Asp
			325					330						335	
Ile	Arg	Arg	Asp	Thr	Ala	Gly	His	Leu	Ala	Phe	Gly	His	Gly	Ile	His
			340					345					350		
Phe	Cys	Ile	Gly	Ala	Pro	Leu	Ala	Arg	Leu	Glu	Ala	Arg	Ile	Ala	Val
		355					360					365			
Arg	Ala	Leu	Leu	Glu	Arg	Cys	Pro	Asp	Leu	Ala	Leu	Asp	Val	Ser	Pro
	370					375					380				
Gly	Glu	Leu	Val	Trp	Tyr	Pro	Asn	Pro	Met	Ile	Arg	Gly	Leu	Lys	Ala
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gaacaacacg	gtgccgacac	ctccgccgtc	cgcgacctgc	tggaagccgc	ctcgcgccgg	300
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<210> 41

<211> 928

<212> PRT

<213> Streptomyces venezuelae

<400> 41

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Leu	Asp	Ala	Ser	Ala	Ala	Gly	Asp	Gly	Thr	Leu	Leu	Leu	Val	Ser	Gly
			20					25					30		
Pro	Ala	Gly	Ser	Gly	Lys	Thr	Glu	Leu	Leu	Arg	Ser	Leu	Arg	Arg	Leu
		35					40					45			
Ala	Ala	Glu	Arg	Glu	Thr	Pro	Val	Trp	Ser	Val	Arg	Ala	Leu	Pro	Gly
		50				55					60				
Asp	Arg	Asp	Ile	Pro	Leu	Gly	Val	Leu	Cys	Gln	Leu	Leu	Arg	Ser	Ala
65					70					75				80	
Glu	Gln	His	Gly	Ala	Asp	Thr	Ser	Ala	Val	Arg	Asp	Leu	Leu	Asp	Ala
			85						90					95	
Ala	Ser	Arg	Arg	Ala	Gly	Asn	Leu	Thr	Ser	Pro	Ala	Asp	Ala	Pro	Leu
			100					105					110		
Arg	Val	Asp	Glu	Thr	His	Arg	Leu	His	Asp	Trp	Leu	Leu	Ser	Val	Ser
		115					120					125			
Arg	Arg	Thr	Pro	Phe	Leu	Val	Ala	Val	Asp	Asp	Leu	Thr	His	Ala	Asp
		130				135					140				
Thr	Ala	Ser	Leu	Arg	Phe	Leu	Leu	Tyr	Cys	Ala	Ala	His	His	Asp	Gln
145					150					155				160	
Gly	Gly	Ile	Gly	Phe	Val	Met	Thr	Glu	Arg	Ala	Ser	Gln	Arg	Ala	Gly
			165						170					175	
Tyr	Arg	Val	Phe	Arg	Ala	Glu	Leu	Leu	Arg	Gln	Pro	His	Cys	Arg	Asn
		180						185						190	

Met	Trp	Leu	Ser	Gly	Leu	Pro	Pro	Ser	Gly	Val	Arg	Gln	Leu	Leu	Ala	195	200	205
His	Tyr	Tyr	Gly	Pro	Glu	Ala	Ala	Glu	Arg	Arg	Ala	Pro	Ala	Tyr	His	210	215	220
Ala	Thr	Thr	Gly	Gly	Asn	Pro	Leu	Leu	Leu	Arg	Ala	Leu	Thr	Gln	Asp	225	230	235
Arg	Gln	Ala	Ser	His	Thr	Thr	Leu	Gly	Ala	Ala	Gly	Gly	Asp	Glu	Pro	245	250	255
Val	His	Gly	Asp	Ala	Phe	Ala	Gln	Ala	Val	Leu	Asp	Cys	Leu	His	Arg	260	265	270
Ser	Ala	Glu	Gly	Thr	Leu	Glu	Thr	Ala	Arg	Trp	Leu	Ala	Val	Leu	Glu	275	280	285
Gln	Ser	Asp	Pro	Leu	Leu	Val	Glu	Arg	Leu	Thr	Gly	Thr	Thr	Ala	Ala	290	295	300
Ala	Val	Glu	Arg	His	Ile	Gln	Glu	Leu	Ala	Ala	Ile	Gly	Leu	Leu	Asp	305	310	315
Glu	Asp	Gly	Thr	Leu	Gly	Gln	Pro	Ala	Ile	Arg	Glu	Ala	Ala	Leu	Gln	325	330	335
Asp	Leu	Pro	Ala	Gly	Glu	Arg	Thr	Glu	Leu	His	Arg	Arg	Ala	Ala	Glu	340	345	350
Gln	Leu	His	Arg	Asp	Gly	Ala	Asp	Glu	Asp	Thr	Val	Ala	Arg	His	Leu	355	360	365
Leu	Val	Gly	Gly	Ala	Pro	Asp	Ala	Pro	Trp	Ala	Leu	Pro	Leu	Leu	Glu	370	375	380
Arg	Gly	Ala	Gln	Gln	Ala	Leu	Phe	Asp	Asp	Arg	Leu	Asp	Asp	Ala	Phe	385	390	395
Arg	Ile	Leu	Glu	Phe	Ala	Val	Arg	Ser	Ser	Thr	Asp	Asn	Thr	Gln	Leu	405	410	415
Ala	Arg	Leu	Ala	Pro	His	Leu	Val	Ala	Ala	Ser	Trp	Arg	Met	Asn	Pro	420	425	430
His	Met	Thr	Thr	Arg	Ala	Leu	Ala	Leu	Phe	Asp	Arg	Leu	Leu	Ser	Gly	435	440	445
Glu	Leu	Pro	Pro	Ser	His	Pro	Val	Met	Ala	Leu	Ile	Arg	Cys	Leu	Val	450	455	460
Trp	Tyr	Gly	Arg	Leu	Pro	Glu	Ala	Ala	Asp	Ala	Leu	Ser	Arg	Leu	Arg	465	470	475
Pro	Ser	Ser	Asp	Asn	Asp	Ala	Leu	Glu	Leu	Ser	Leu	Thr	Arg	Met	Trp	485	490	495
Leu	Ala	Ala	Leu	Cys	Pro	Pro	Leu	Leu	Glu	Ser	Leu	Pro	Ala	Thr	Pro	500	505	510
Glu	Pro	Glu	Arg	Gly	Pro	Val	Pro	Val	Arg	Leu	Ala	Pro	Arg	Thr	Thr	515	520	525
Ala	Leu	Gln	Ala	Gln	Ala	Gly	Val	Phe	Gln	Arg	Gly	Pro	Asp	Asn	Ala	530	535	540
Ser	Val	Ala	Gln	Ala	Glu	Gln	Ile	Leu	Gln	Gly	Cys	Arg	Leu	Ser	Glu	545	550	555
Glu	Thr	Tyr	Glu	Ala	Leu	Glu	Thr	Ala	Leu	Leu	Val	Leu	Val	His	Ala	565	570	575
Asp	Arg	Leu	Asp	Arg	Ala	Leu	Phe	Trp	Ser	Asp	Ala	Leu	Leu	Ala	Glu	580	585	590
Ala	Val	Glu	Arg	Arg	Ser	Leu	Gly	Trp	Glu	Ala	Val	Phe	Ala	Ala	Thr	595	600	605
Arg	Ala	Met	Ile	Ala	Ile	Arg	Cys	Gly	Asp	Leu	Pro	Thr	Ala	Arg	Glu	610	615	620
Arg	Ala	Glu	Leu	Ala	Leu	Ser	His	Ala	Ala	Pro	Glu	Ser	Trp	Gly	Leu	625	630	635
Ala	Val	Gly	Met	Pro	Leu	Ser	Ala	Leu	Leu	Leu	Ala	Cys	Thr	Glu	Ala	645	650	655
Gly	Glu	Tyr	Glu	Gln	Ala	Glu	Arg	Val	Leu	Arg	Gln	Pro	Val	Pro	Asp	660	665	670
Ala	Met	Phe	Asp	Ser	Arg	His	Gly	Met	Glu	Tyr	Met	His	Ala	Arg	Gly	675	680	685

Arg Tyr Trp Leu Ala Thr Gly Arg Leu His Ala Ala Leu Gly Glu Phe  
 690 695 700  
 Met Leu Cys Gly Glu Ile Leu Gly Ser Trp Asn Leu Asp Gln Pro Ser  
 705 710 715 720  
 Ile Val Pro Trp Arg Thr Ser Ala Ala Glu Val Tyr Leu Arg Leu Gly  
 725 730 735  
 Asn Arg Gln Lys Ala Arg Ala Leu Ala Glu Ala Gln Leu Ala Leu Val  
 740 745 750  
 Arg Pro Gly Arg Ser Arg Thr Arg Gly Leu Thr Leu Arg Val Leu Ala  
 755 760 765  
 Ala Ala Val Asp Gly Gln Gln Ala Glu Arg Leu His Ala Glu Ala Val  
 770 775 780  
 Asp Met Leu His Asp Ser Gly Asp Arg Leu Glu His Ala Arg Ala Leu  
 785 790 795 800  
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 Arg Met Thr Ala Arg Leu Ala Gly Asp Met Ala Trp Ala Cys Gly Ala  
 820 825 830  
 Tyr Pro Leu Ala Glu Glu Ile Val Pro Gly Arg Gly Gly Arg Arg Ala  
 835 840 845  
 Lys Ala Val Ser Thr Glu Leu Glu Leu Pro Gly Gly Pro Asp Val Gly  
 850 855 860  
 Leu Leu Ser Glu Ala Glu Arg Arg Val Ala Ala Leu Ala Ala Arg Gly  
 865 870 875 880  
 Leu Thr Asn Arg Gln Ile Ala Arg Arg Leu Cys Val Thr Ala Ser Thr  
 885 890 895  
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Ala	Gly	Gly	Ser	Ala	Ser	Tyr	Phe	Arg	Phe	Ser	Glu	Glu	Leu	His		35	40	45	
Pro	Ser	Val	Glu	Ala	Leu	Ser	Val	Gln	Tyr	Pro	Gly	Arg	Gln	Asp	Arg	50	55	60	
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Val	Ala	Ala	Thr	Glu	Pro	Trp	Trp	Gln	Glu	Gly	Arg	Leu	Ala	Phe	Phe	85	90	95	
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Ser	Asp	Tyr	Lys	Ala	Ala	Glu	Thr	Tyr	Leu	His	Arg	Pro	Ser	Ala	Lys	180	185	190	
Leu	Thr	Cys	Pro	Val	Met	Ala	Leu	Ala	Gly	Asp	Arg	Asp	Pro	Lys	Ala	195	200	205	
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Cys	Leu	Arg	Ala	Tyr	Ser	Gly	Gly	His	Phe	Tyr	Leu	Asn	Asp	Gln	Trp	225	230	235	240
His	Glu	Ile	Cys	Asn	Asp	Ile	Ser	Asp	His	Leu	Leu	Val	Thr	Arg	Gly	245	250	255	
Ala	Pro	Asp	Ala	Arg	Val	Val	Gln	Pro	Pro	Thr	Ser	Leu	Ile	Glu	Gly	260	265	270	
Ala	Ala	Lys	Arg	Trp	Gln	Asn	Pro	Arg								275	280		

B'  
Cont